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## Prevalence of dry eye status in type ii diabetes mellitus patients

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### Abstract

**Background:** Dry eye is a disorder of precorneal tear film frequently present in patients with diabetes mellitus (DM) either symptomatic or asymptomatic. It can cause mild symptoms to severe corneal complications affecting the visual quality of life.

**Objective:** To assess the dry eye status among type 2 diabetes mellitus in patients attending Ophthalmology OPD in Sree Mookambika institute Of Medical Sciences, kulasekharam.

**Materials and methods:** This was a hospital based cross-sectional study where 87 patients with type 2 diabetes mellitus of age more than 40 years are studied. The dry eye status was evaluated using schirmer's test, Tear Film breakup time (TBUT) measurement. Statistical method of analysis: study parameters entered in Microsoft office Excel 2013.SPSS trail version-20.

**Result:** Among 87 type 2 diabetes mellitus patient above the age of 40 years, 55.3% had significant dry eye, more prevalent in patients aged over 50 years.

**Conclusion:** Dry eye is more prevalent among diabetic patients. Strict glyceimic control is important for the prevention of dry eye syndrome and other ocular surface pathology among type 2 diabetes mellitus patients.

**Keywords:** Prevalence, eye status, diabetes, patients

### Introduction

Dry eye is a ocular surface disorder of the precorneal tear film due to deficiency of tear or excessive evaporation which results in damage to the interpalpebral area causing ocular discomfort. The prevalence of DES in diabetes has been reported to be up to 54.3% [1]. According to an Indian study by Khurana *et al.* [2], dry eye is incident among 0.46% of ophthalmology outpatients in India. Globally type 2 diabetes mellitus is the predominant form of diabetes, 90% of cases globally [3]. India leads the world in diabetic population and estimated to have 62.4 million people with diabetes. It is predicted that by 2030, in India, DM may affect up to 79.4 million [4].

Corneal epithelium, endothelium, nerves and immune cells shows specific systemic complications of diabetes. Corneal neuropathy can indicate peripheral and autonomic neuropathy, therefore gives an opportunity for early treatment. Alterations of immune cells in cornea implies inflammatory component of diabetic complications. It causes both quantitative and qualitative abnormalities in tear secretion, decreased corneal sensitivity and poor adhesion of regenerating epithelial cells. All these suggest an widespread disease of the ocular surface due to diabetes including common disease like dry eye, recurrent corneal erosions to severe complications like corneal ulcerations, superficial punctate keratopathy and persistent epithelial defects. Strict glyceimic control is important for the prevention of dry eye syndrome and other ocular surface pathology. Early diagnosis of dry eye syndrome in diabetic patients is important for improving the ocular surface and quality of vision [5].

### Methodology

**Study design:** Cross sectional study.

**Study Setting:** Kanyakumari district. Kanyakumari is the southernmost district of Tamil Nadu. Approximate total duration of the study: 3 months.

**Sample size:** 85.

**Sampling technique:** Convenient sampling technique. Inclusion criteria:

Type 2 diabetic patients.

Age group of more than 40 years.

Either sex.

**Exclusion criteria**

Patients on systemic medications such as antihistamines, tricyclic antidepressants, oral contraceptives and other medications which are known to cause dry eye.

**Contact lens users**

Patients who have undergone ocular surgery (LASIK/intraocular). Patients having local or systemic conditions other than diabetes mellitus known to cause dry eye.

**Smokers**

**Procedure in detail**

This is a cross sectional hospital based study over a period of 3 months. 85 Type 2 diabetes mellitus patients attending Ophthalmology outpatient department of Sree Mookambika Institute of Medical Sciences will be examined. 85 patients fitting into inclusion and exclusion criteria will be included in the study and basic information of the patients collected. A detailed ocular and medical history will be taken. A detailed general physical examination will be performed. A comprehensive ophthalmological examination including visual acuity using Snellen’s chart and a thorough anterior segment examination using slit lamp microscope was carried out. The dry eye was detected by measuring tear film breakup time (TBUT) and schirmer's test. TBUT test was performed by staining the tear film using a

fluorescein impregnated strip without using topical anesthesia and asking the subjects to blink three times and then cease blinking until instructed. The tear film was observed using a slit lamp with blue cobalt filter. The time interval between the last blink and the appearance of the first random corneal dry spot in the tear film was measured. A value

<10 seconds was considered abnormal. TBUT results graded as >10 secs-normal, 6-10 secs-mild to moderate, and <6 secs-severe.

Schirmer test was performed without topical anesthesia using standardized Whatman filter paper 41. The strips were placed in the lower fornix away from the cornea and left in place for 5 min with the patient opened eyes. The wetting distance was measured in millimeters, and a reading <10 mm was considered abnormal.

**Result**

**Table 1:** Show the dry eye

	Dry eye		Total	
	No	Yes		
Diabetic patients	N	38	47	85
	%	44.7%	55.3%	100.0%

Among 85 patients with type 2 diabetes mellitus, 47 patients (55.3%) were diagnosed to have dry eye.

**Table 2:** Age distribution of dry eye in diabetics

		Dry Eye		Total
		No	Yes	
41-50 years	N	3	3	6
	%	50%	50%	100.0%
51-60 years	N	18	21	39
	%	46%	54%	100.0%
Above 60 years	N	17	23	40
	%	42.5%	57.5%	100.0%
Total	N	38	47	100
	%	44.7%	55.3%	100.0%

**Table 3:** Sex distribution among diabetic patients

		Dry Eye		Total	
		No	Yes		
Sex	Male	N	22	27	49
		%	44.9%	55.1%	100.0%
		N	16	20	36
		%	44.5%	55.5%	100.0%
Total	N	38	47	100	
	%	44.7.0%	55.3%	100.0%	

**Discussion**

This was a hospital-based cross-sectional study which included 85 patients with type 2 DM attending the Ophthalmology Department of a tertiary care center in Sree Mookambika Institute of Medical Sciences. Diabetes is one of the most common leading causes of blindness in 20-74-year old persons 6. Cataract and retinopathy are well-known as ocular complications of diabetes. Recently, problems involving the ocular surface, dry eyes in particular, have been reported in diabetic patients [6]. In this study the prevalence of dry eye in diabetics was 55.3%. These observations indicate that dry eye is a significant factor responsible for ocular surface disease in diabetics. Similar to our study Manaviat *et al.* studied the prevalence of dry eye

and diabetic retinopathy (DR) in type 2 diabetics with 199 subjects, among whom 108 patients (54.3%) suffered from dry eye syndrome 1.

Seifart *et al.* conducted a study on dry eye syndrome and diabetes mellitus. 92 patients with diabetes types I and II and aged from 7 to 69 years were compared with a group of normal healthy controls comparable in number, age and sex. The main points of comparison were subjective complaints, objective findings on conjunctiva and cornea, break-up time (BUT), basal secretion test, impression cytology of the conjunctiva, and grade of diabetic retinopathy. The results show that 52.8% of all diabetic subjects complained of dry eye symptoms, as against 9.3% of the controls. A BUT value lower than 10 s was found in 94.2% of the diabetics and in only 5.8% of the controls. Basal secretion test lower than 5 mm was observed in 26% of the diabetics and in 16% of the normal controls. Pathologic conjunctival epithelium (grade III-V after Tseng) was found in 86% of the diabetic patients and in 6.7% of the healthy subjects. Among the type II diabetic patients, 70% had proven dry eye syndrome, while 57% with type I diabetes suffered from this [7].

Nepp *et al.* studied the correlation between the severity of Diabetic Retinopathy and Keratoconjunctivitis Sicca. Patients with diabetic retinopathy (DR) seldom report

symptoms of ocular surface irritation, but evaluations of dryness are pathologic. The study included 144 eyes of 72 patients [8].

In this study, Dry eye was more prevalent in patients aged over 50 years showing a significant association between the age and dry eye.

Of the 85 consecutive patients included in the study, 49 were male and 36 were female. Among 49 male patients, 27 patients (56.37%) had dry eye and among 45 female's patients, 26 patients (57.78%) had dry eye symptoms. These observations indicate that dry eye is a significant factor responsible for ocular surface disease in diabetics. High prevalence could be attributed to reduced tear secretion in DM patients caused by autonomic dysfunction in these patients. The tropical and dry climate in our region would be an added factor for the increased prevalence of dry eye in our study.

### Conclusion

This study estimated the prevalence of dry eye to be 55.30% among type 2 diabetes mellitus patients of age more than 40 years in Kulasekharam, Kanyakumari, Hospital based type 2 diabetic population attending ophthalmology outpatient department Sree Mookambika Institute of Medical Sciences. Early diagnosis of dry eye syndrome in diabetic patients is important for improving the ocular surface and quality of vision. Therefore examination for dry eye should be an integral part of the assessment of diabetic eye disease.

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**Conflict of interest:** None.

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