

# Incidence of Dry Eye Syndrome in Patients with Type II Diabetes Mellitus

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## Abstract

**Background:** Keratoconjunctivitis sicca or dry eyes is a multifactorial disorder affects the tear film and ocular surface due to abnormalities in the quality or quantity of the tear film. Though diabetic retinopathy (DR) and diabetic cataracts are well-known complications, dry eye syndrome (DES) is also common in the diabetic population.

**Aim:** Aim of our study is to know the incidence of dry eyes in diabetes and other systemic factors which affects progression of the disease.

**Methods:** This is a prospective cohort study conducted in 50 diabetic patients using various tests to diagnose and grade dry eyes. In this study, Schirmer's test type I and type II, Tear meniscus height, Tear film break up time, Fluorescein stain were used to diagnose and grade dry eyes. Results: DES having 56% incidence, common age group affected is 60 years and above (61%). Hypertension was an important comorbid systemic association found in our study. We concluded that diabetes is the important risk factor for DES.

**Conclusion:** Examination of the ocular surface and tear function also become part of the routine diabetic ophthalmic assessment and follow-up.

**Key words:** Diabetes, Dry eyes, Dry eye syndrome

## INTRODUCTION

Diabetes mellitus (DM) is a disease which is often followed by microvascular complications, such as nephropathy, neuropathy, and retinopathy. It is one of the main causes of blindness in people aged between 20 and 74. DM has been identified as one of the leading systemic risk factors for dry eye syndrome (DES).

DES is major tear deficiency disorder which causes discomfort, visual disturbances, and tear film instability with potential damage to the ocular surface.<sup>1</sup> DM has been identified as a risk factor for DES and which is further

complicated by recurrent epithelial erosions, epithelial defect, and corneal ulcer. The prevalence of DES in diabetes is around 54%.<sup>2</sup> Hence, it is important to make early diagnoses of this disease.<sup>3</sup>

Diabetic patients have classic symptoms of dry eye, including irritation, foreign body sensation, burning, itchiness, pain, or redness; autonomic dysfunction may be the mechanism responsible for dry eye in the diabetic patient and aldose reductase, the first enzyme of the sorbitol pathway may also be involved.<sup>4</sup> Jin *et al.* showed that Type II diabetic patients have a greater tendency to develop tear dysfunction.<sup>5</sup>

## Aim

The aim of this study is to study the incidence of dry eyes in Type II diabetic patients.

## MATERIALS AND METHODS

It is a prospective cohort study of 50 patients of diabetes conducted at Tirunelveli Medical College Hospital. In

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this study, Schirmer's test Types I and II, tear meniscus height, tear film breakup time, fluorescein stain were used to diagnose and grade dry eyes. Its severity is classified into mild, moderate, severe, and very severe (level 1-4) according to DEWS dry eye grading system. Duration of diabetes, other associated ocular disorders, and systemic comorbid conditions was also included in this study.

## RESULTS

Among 50 patients of Type II diabetes, 38 were females and 12 were males. Among 38 females, 22 had dry eyes and among 12 males, 6 had dry eyes. Females had higher incidence of dry eyes of about 58%. Common age group affected is 60 years and above (Table 1). Out of 28, 14 had mild dry eyes, 10 had moderate dry eyes, and 4 had severe dry eyes. Among 50 patients of diabetes, 5 had diabetic retinopathy (DR) ranging from mild non-proliferative DR (NPDR) to severe NPDR of which 4 had dry eyes, 2 mild, 1 moderate, and 1 severe dry eye. About 13 of 28 dry eye patients had associated systemic hypertension, 4 patients had associated ischemic heart disease, 2 patients had connective tissue disorder rheumatoid arthritis, and 1 had chronic kidney disease (Table 2). Among 12 males, 6 had smoking history of which 5 had dry eyes (Table 3).

## DISCUSSION

In our study, among 50 patients of diabetes, 28 (56%) had dry eyes which is comparable with Manaviat *et al.* study.<sup>2</sup> Female patients (58%) had higher incidence of dry eyes than males (50%). Dry eyes found to be higher in the age group above 60 years.<sup>1</sup> Diabetes affects ocular surface by variety of mechanisms. It causes lacrimal gland dysfunction and tear film dysfunction by abnormal enzymatic activity.<sup>5</sup> It also causes corneal and conjunctival epithelial damage, inducing reduction of the number of goblet cells thus it reduces mucin production. Diabetes associated DES severity further increased by the presence of comorbid conditions like hypertension.<sup>6</sup> The cause of this correlation may be autonomic neuropathy and damage to microvasculature of the lacrimal gland as well as sensorial corneal neuropathy. Effect of smoking was found to be an important risk factor in dry eyes by retarding tear secretion which is similar to Uchino *et al.* study.<sup>7</sup> Significant associations have been identified between DR and DES. Dry eye symptoms are typically severe in patients with diabetes whose glycemic control is poor.<sup>8,9</sup> Inflammation and immunity have been shown to play a prominent role in the pathogenesis of

**Table 1: Distribution of patient's age**

Age (years)	Dry eye	
	Yes	No
40-50	3	6
50-60	9	6
Above 60	16	10

**Table 2: Distribution of comorbid of study patients**

Comorbid	Dry eye	
	Yes	No
HT	13	8
IHD	4	2
CTD	2	0

IHD: Ischemic heart disease, HT: Hypertension, CTD: Connective tissue diseases

**Table 3: Distribution of smoking history of study patients**

Smoking history	Dry eyes	
	Yes	No
Smokers	5	1
Non smokers	1	5

DES. Riordan-Eva and Vaughan studied that diabetic patients had lower values of tear secretion and values of tear breakup time test than the control group. If this syndrome is diagnosed at first stage and treated, it would be protected from its complications.<sup>3</sup>

## CONCLUSION

As the patients may have corneal hypesthesia might be asymptomatic. Screening, early diagnosis, and treatment of dry eye are essential to avoid ocular surface complications and visual morbidity. Hence, dry eye screening should be a part of the visual assessment of diabetic patients.

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