

STUDY OF PREVALENCE OF DRY EYE IN DIABETES

Vivek Mahadev Sahasrabudhe¹, Mahavir Mukundarao Kandharwar², Gayatri Manohar Fulse³

¹Professor and HOD, Department of Ophthalmology, Dr. Shankarrao Chavan Government Medical College, Nanded, Maharashtra.

²Junior Resident, Department of Ophthalmology, Dr. Shankarrao Chavan Government Medical College, Nanded, Maharashtra.

³Junior Resident, Department of Ophthalmology, Dr. Shankarrao Chavan Government Medical College, Nanded, Maharashtra.

ABSTRACT

BACKGROUND

Diabetes causes blindness in 20-74 year old persons. Blindness in diabetic patients may due to cataract or retinopathy. Dry eye is one of the ocular surface problem increasingly observed in diabetic patients. This study was performed to assess the prevalence of dry eye syndrome in type 2 diabetic patients and their contributing factors.

MATERIALS AND METHODS

A cross-sectional study was done between April 2016 to September 2016. 70 patients of type 2 diabetes diagnosed at Dr. Shankarrao Chavan Government Hospital, Nanded, were included in this study. Patients were assessed by questionnaire about other diseases and drugs. Dry eye syndrome was assessed with Tear Breakup Time (TBUT), Schirmer's test, lissamine green staining apart from routine ophthalmic examination.

RESULTS

Out of 60 patients, 32 (53%) suffer from dry eye syndrome.

CONCLUSION

Diabetes and dry eyes appear to have a common association. Further studies need to be undertaken to establish an aetiological relationship. As routine dilated fundus examination is an integral part of evaluation of diabetic patients in ophthalmic clinics, examination for dry eye should also be an integral part of the assessment of diabetic eye disease.

KEYWORDS

Dry Eye, Diabetes, Prevalence.

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BACKGROUND

Diabetes mellitus, commonly referred to as diabetes, is a group of metabolic diseases in which there are high blood sugar levels over a prolonged period. Symptoms of high blood sugar include frequent urination, increased thirst and increased hunger. If left untreated, diabetes can cause many complications. Diabetes is caused by either pancreas not producing enough insulin or due to body doesn't respond to insulin produced by pancreas. Type 2 DM begins with insulin resistance, a condition in which cells fail to respond to insulin properly. With progression of disease, insulin lack may also develop. Excessive body weight and lack of exercise are common causes. Maintaining a healthy diet, regular physical exercise, a normal body weight and avoiding use of tobacco are preventive measures to be taken.

Diabetes is one of the most common leading causes of blindness in 20-74 year old persons.¹ Diabetic retinopathy is

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Corresponding Author:*

*Dr. Mahavir Mukundarao Kandharwar,
Junior Resident, Department of Ophthalmology,
Dr. Shankarrao Chavan Government Medical College,
Vishnupuri, Nanded - 431606, Maharashtra, India.
E-mail: kandharwar@gmail.com
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the result of damage to the small blood vessels and neurons of the retina. Cataract and retinopathy are well-known as ocular complications of diabetes. Diabetic retinopathy, also known as diabetic eye disease, is when damage occurs to the retina due to diabetes. It can eventually lead to blindness. It affects up to 80 percent of people who have had diabetes for 20 years or more. The longer a person has diabetes, the higher his or her chances of developing diabetic retinopathy. Recently, problems involving the ocular surface, dry eyes in particular have been reported in diabetic patients.¹ Symptoms of dry eye include irritation, redness, discharge and easily fatigued eyes. Blurred vision may also occur. The symptoms can range from mild and occasional to severe and continuous. Dry eye occurs when either the eye does not produce enough tears or when the tears evaporate too quickly. These patients suffer from a variety of corneal complications including superficial punctate keratopathy, trophic ulceration and persistent epithelial defect.² Dry eye is an important contributor to these problems.

Dry eye syndrome has many causes. One of the most common reasons for dryness is aging process.³ The mechanism responsible for dry eyes is unclear,⁴ but autonomic dysfunction maybe responsible.⁵ Aldose reductase, the first enzyme of the sorbitol pathway may also be involved. The oral administration of aldose reductase inhibitors has been shown to improve the tear dynamics significantly.⁶ In one study, a correlation was found between

the glycated haemoglobin (HbA1C) and the presence of dry eye syndrome. Tightly controlled blood sugar is one of the first steps in successful diabetic dry eye management. The higher the HbA1c values, the higher the rate of dry eye syndrome.⁷ In another study founded that diabetic patients had lower values of tear secretion and values of tear breakup time (TBUT) than control group.⁸ Jin et al showed that patients with type 2 diabetes tend to develop tear film dysfunction. This study suggests that TBUT should be a routine ophthalmologic test in diabetic patients.⁹ Dry eye can lead to vision deficit, scarring and perforation of the cornea and secondary bacterial infection. The corneal complications caused by hyperglycaemia include superficial punctate keratopathy, trophic ulcers, persistent epithelial defects and recurrent corneal erosions; all these associated with dry eye syndrome.¹⁰ If this syndrome is diagnosed at first stage and treated would be protected from its complications.² Increasing prevalence of dry eye syndrome has been reported in recent years. In addition to the diabetic retinopathy, which is the leading cause of blindness, more attention should be paid to dry eye disease also. Therefore, dry eye syndrome should be diagnosed early in diabetic patients, so that we can start treatment in early stages. Nevertheless, studies to evaluate the prevalence of dry eye syndrome in type 2 diabetic patients are very few. Therefore, we have taken this study on prevalence of dry eye syndrome in type 2 diabetic patients.

Objective- To know prevalence of dry eye in diabetes.

Materials and Methods

The present study on "A study of prevalence of dry eye in diabetes" has been conducted by utilising cases admitted and managed in the Department of Ophthalmology at Dr. Shankarrao Chavan Government Medical College, Nanded, over a period of six months from April 2016 to September 2016 after obtaining clearance from ethical committee. A cross-sectional study of 70 cases of dry eye in diabetic patients was done. Diagnosis is mostly based on the symptoms though a number of other tests may be used. Dry eyes were suspected on the basis of a history of ocular discomfort including soreness, gritty sensation, itchiness, redness, blurred vision that improves with blinking and excessive tearing. The condition was confirmed by ocular surface dye staining pattern with fluorescein, Tear Film Breakup Time (TBUT) (normal >10 seconds) and Schirmer test (value 15 mm in 5 mins.), according to American Academy of Ophthalmology by a specialist.¹¹ Diagnosis was established by positivity one or more of the tests (TBUT or Schirmer test). Structures of the eye were assessed with slit lamp biomicroscopy examination.

Inclusion Criteria

Diagnosed diabetic patients.

Exclusion Criteria

Other conditions causing dry eye like cigarette smoking, contact lens use, LASIK surgery, allergies, Sjogren's

syndrome, rheumatoid arthritis, Parkinson's disease, lupus, some medications such as antihistamines, tricyclic antidepressants, oral contraceptives and drugs used to treat high blood pressure and diuretics and also vitamin A deficiency and pregnancy were excluded.

OBSERVATION AND RESULTS

Total of 60 cases of diabetes were studied and following conclusions were drawn.

Age Distribution

The mean age of subjects was 54.16 ± 11.02 years. Frequency of dry eye syndrome in 65-85 years old group was highest (66.7%) and in 27-41 year old group was lowest, but this correlation was not significant (P=0.9).

Sex Distribution

Among the study group, 53.33% are males and 46.67% are females.

Sex	Number of Patients	Percentage
Female	28	46.67
Male	32	53.33
Total	60	100

Table 1. Distribution According to Sex

Prevalence of Dry Eye in Diabetes

Among the study group, 54.3%, i.e. 32 patients have dry eye and 28 patients doesn't have dry eye.

Diagnosis	Number of Patients	Percentage
Dry eye	32	53.33
Without dry eye	28	46.67
Total	60	100

Table 2. Distribution According to Dry Eye and without Dry Eye

Distribution According to Sex and Dry Eye

Of 60 subjects, 32 patients (54.3%) had dry eye syndrome in which 19 (58%) were females and 13 (48.8%) were male. But, there was not a significant association between sex and frequency of dry eye syndrome (P=0.2).

Sex	Dry Eye	Without Dry Eye
Male	13	19
Female	19	9
Total	32	28

Table 3. Distribution According to Sex and Dry Eye

Distribution According to Dry Eye Syndrome and Mean Duration of Diabetes

Of 32 patients with dry eye syndrome, the mean duration of diabetes was 11.48 ± 7.4 years, whereas this was 9 ± 6.5 years in subjects without dry eye syndrome. A significant association was observed between duration of diabetes and frequency of dry eye syndrome (P=0.01).

	Mean Duration of Diabetes in years
Dry eye syndrome	11.48 ± 7.4
Without dry eye syndrome	9 ± 6.5

Table 4. Distribution According to Dry Eye Syndrome and Mean Duration of Diabetes

Distribution According to Blood Sugar Level

Among study group, 43.33% have fasting blood sugar level <126 mg% and 56.66% have fasting blood sugar level >126 mg%, which is statistically not significant (p=0.085).

	Fasting Blood Sugar Level (mg%)		Total
	<126	>126	
Dry eye	10	22	32
Without dry eye	16	12	28

Table 5. Distribution According to Blood Sugar Level

Findings among the Study Group

Of 32 patients with dry eye syndrome, 36.18% suffered from gritty sensation, 19.09% had soreness, whereas none of them complains from pain and tearing. 11.5% had abnormal both TBUT and Schirmer's test and 38% of subjects had abnormal corneal staining. Corneal lesion, conjunctivitis, keratopathy and filamentary were not observed.

Test	Findings Percentage
Abnormal TBUT	11.5
Abnormal Schirmer's test	11.5
Abnormal corneal staining	38

Table 6. Findings among the Study Group

DISCUSSION

Some studies evaluated dry eye syndrome in diabetic patients. In a cohort study on 3722, subjects were aged 48 to 91 years (65 ± 10 years) and 43% male. The overall prevalence of dry eye was 14.4%. Prevalence varied from 8.4% in subjects younger than 60 years to 19.0% in those older than 80 years. Age-adjusted prevalence in men was 11.4% compared with 16.7% in women.¹²

In another study, a group of 140 patients aged 24-93 suffering from dry eye syndrome were assessed. A larger number of dry eye syndrome cases were identified in female patients, especially aged over 50 (80% of females and 20% of males). The most frequent general medical conditions diagnosed in the group of patients were as follows- arterial hypertension (men and women) and diabetes (women).¹³

In one study, during the 5-year interval between examinations, a history of dry eye developed in 322 of 2414 subjects for an incidence of 13.3%. Incidence was significantly associated with age. After adjusting for age, incidence was greater in subjects with a history of allergy or diabetes who used antihistamines or diuretics and with poorer self-rated health.¹⁴

A cross-sectional study assessed one hundred patients with diabetes mellitus. Multiple regression analysis using the

Schirmer test as a dependent variable and controlling for all the independent variables showed an association with autonomic neuropathy. No significant association was observed with the other variables including the presence of autoantibodies. This study suggests that the low tear production seen in some DM patients is related to dysfunction of the autonomic nervous system.⁷

Seifart et al compared 92 patients with diabetes types I and II and aged from 7 to 69 years with a group of normal healthy controls comparable in number, age and sex. The results show that 52.8% of all diabetic subjects complained of dry eye symptoms as against 9.3% of the controls. They concluded close monitoring of diabetic patients and good blood sugar regulation is important for the prevention of dry eye syndrome and retinopathy.⁸

CONCLUSION

So, on behalf of support of above findings, we can say that diabetic patients have an elevated prevalence of dry eye syndrome. Further studies need to be undertaken to establish an aetiologic relationship. Examination for dry eyes should be an integral part of the assessment of diabetic eye disease. We should run tests to detect dry eye syndrome. In clinical practice, diabetics undergo regular fundus examinations. The examination of the ocular surface and tear function should also become part of the routine diabetic ophthalmic assessment and follow-up.

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