



DIABETICS WITH DRY EYE: A PREVALENCE STUDY

Ophthalmology

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ABSTRACT

This study was done to estimate the prevalence of type 2 diabetics suffering from dry eye and to study the relation of dry eye with glycosylated haemoglobin levels. A prospective descriptive study was done in the outpatient department of ophthalmology of Government Medical College, Jammu on 80 patients of type 2 diabetes. Tear film break-up time (TBUT) < 10 seconds and Schirmer's test I < 10 mm after 5 minutes, was taken as criteria for dry eye. Statistically significant, direct relation was seen between severity of dry eye and poor glycemic control (p value < 0.01). We concluded that dry eye adds to the burden of disease in diabetics.

KEYWORDS

glycosylated, dry eye, diabetic

INTRODUCTION

In Indian subcontinent, diabetes mellitus is a leading cause of morbidity.¹ It is a microvascular disease which leads to retinopathy, neuropathy, and nephropathy.² It can be type 1 (autoimmune destruction of pancreatic islet cells) or can be Type 2 (insulin resistance at the receptor level) out of which type 2 is more common.^{3,4,5,6} The overall prevalence of diabetes in India is 7.3%, and it is about 5% in urban population.^{7,8,9} India will be home to 50% of world's diabetics by 2025.¹⁰

Dry eye disease is a major health problem due to which patients have to compromise their quality of life. Prevalence of dry eye disease in India ranges from 18.4% to 54.3%.¹¹

Cataract and retinopathy are two major potentially blinding complications of diabetes which have been extensively researched in literature, apart from these diabetics are also prone for ocular surface disease.¹² Neuropathy, metabolic dysfunction and altered tear quantity and quality are the important factors causing dry eye in diabetic patients.¹³ In long standing cases of diabetes, there is damage to microvasculature of lacrimal gland and impairment of lacrimation due to autonomic neuropathy.¹⁴

Schirmer's I test is done without topical anesthesia and it measures the secretion of tears over 5 minutes. A value of more than 10 millimeter (mm) is considered normal. Tear film break up time (TBUT) is the time interval between the last blink and appearance of first corneal black spot in the stained tear film. A value of more than 10 seconds is considered normal. Glycosylated hemoglobin (HbA1c) reflects average plasma glucose over the previous 8-12 weeks. It is recommended that > 6.5% is diagnostic of diabetes. HbA1c levels represent the control of diabetes in last three months.

This present study was conducted to estimate the prevalence of dry eye in type 2 diabetics. And to study the relation between dry eye and glycosylated hemoglobin levels.

MATERIAL AND METHODS

This was a descriptive prospective study conducted in the outpatient department (OPD) of Ophthalmology of Government Medical College (GMC), Jammu, from April, 2019 to September, 2019.

Inclusion criteria

- All patients of type 2 diabetes coming to Eye OPD at GMC, Jammu.

Exclusion criteria

- Those taking antihistaminics or tricyclic antidepressants, oral contraceptives and diuretics or instilling any topical medications.
- Those who had undergone LASIK surgery, any previous intra/extra ocular surgery.

- Those with lid deformity.
- Those with vitamin A deficiency.
- Patients with Sjogren syndrome, rheumatoid arthritis, systemic lupus erythematosus, and Parkinson's disease.
- Contact lens wearers.
- Smokers.
- Pregnant women.

After taking informed consent from all the patients, their data was noted. Detailed ocular examination including Tear film break up time and Schirmer's I test were performed and HbA1c test was advised. Patients were graded into mild, moderate and severe dry eye on the basis of TBUT and Schirmer's I test (Table 1). Grading of control of diabetes as indicated by HbA1c levels was done (Table 2).

Table 1: Grading of Dry Eye

Dry Eye	Schirmer's I Test	TBUT
Normal	> 10 mm	> 10 min
Mild	< 10 mm	< 10 min
Moderate	< 5 mm	< 5 min
Severe	< 2 mm	Immediate

Table 2: HbA1c as indicator of diabetes control

HbA1c	Diabetes Control
5% - 6.6%	Excellent
6.7% - 7.2%	Good
7.3% - 7.6%	Fair
7.7% - 8.6%	Poor
> 8.7%	Very Poor

RESULTS

In this present study, all the patients underwent TBUT, Schirmer's I test and HbA1c test. Data from all 80 patients was studied. Mean age was 51.28±8.32 years and about 60% of patients were females (Table 3). On Schirmer's I testing, about 65% patients were found to have dry eye. On TBUT testing, 66% patients had dry eye (Table 4). On the basis of HbA1c, about 50% patients had diabetes under control (Table 5). On comparing the severity of dry eye (Schirmer's I test) with diabetic control and applying chi square test statistically significant correlation was seen (χ^2 (1, N = 80) = 94.9, p < .00001) (Table 6). And on applying chi square test to compare the dry severity (TBUT) with diabetic control again statistically significant relationship was seen (χ^2 (1, N = 80) = 41.86, p = .000035) (Table 7).

Table 3: Basic data (N=80)

Gender	[n (%)]
Male	32 (40)
Female	48 (60)
Age (Years)	
Mean	51.28±/-8.32
Range	31 – 65

Table 4: Schirmer's I test and TBUT score

	Schirmer's I [n (%)]	TBUT [n (%)]
Normal	28 (35)	27 (33.8)
Mild	30 (37.5)	33 (41.2)
Moderate	12 (15)	12 (15)
Severe	10 (12.5)	8 (10)

Table 5: Diabetes control

Diabetes Control	[n (%)]
Excellent	17 (21.2)
Good	25 (31.2)
Fair	24 (30)
Poor	8 (10)
Very Poor	6 (8)

Table 6: Comparison between Schirmer's I and Diabetes control

	Normal	Mild Dryness	Moderate Dryness	Severe Dryness
Diabetes Control				
Excellent	15	2	0	0
Good	11	14	0	0
Fair	2	12	10	0
Poor	0	2	2	4
Very poor	0	0	0	6

Table 7: Comparison between TBUT and Diabetes control

	Normal	Mild Dryness	Moderate Dryness	Severe Dryness
Diabetes Control				
Excellent	15	2	0	0
Good	10	14	0	1
Fair	2	12	8	2
Poor	0	3	2	3
Very poor	0	2	2	2

DISCUSSION

Type 2 diabetes mellitus has a potential risk for dry eye. Mucin layer deficiency, decreased tear secretion and reduced corneal sensitivity leads to dry eye in diabetics.¹⁵ In addition to diabetes, dry eye can also lead to vision deficit if left undiagnosed, therefore early diagnosis and commencing the treatment in early stages is the key to a better vision-related quality of life.¹⁶

Kaisermann et al and Fuerst et al ascertained no significant correlation of dry eye with gender, although more number of females were involved.^{17,18} In the present study also, females were more affected than males.

The prevalence of dry eye in diabetes has been reported to be up to 54.3%.¹⁹ Divya et al studied 100 patients of type diabetes mellitus and found 54 out of them were suffering from dry eye.¹² In our study we found that 65% of patients had some grade of dry eye.

Kaisermann et al, J Nepp et al, Manaviat et al, Najafi et al concurred from their respective studies that HbA1c had a significant positive correlation with dry eye.^{17,20,21,22} Whereas Olaniyan et al, Fuerst et al and Sagdik et al reported no statistically significant relation between HbA1c levels and dry eye.^{23,18,24} Our study, observed a significant relationship ($p < .001$) between dry eye and HbA1c levels.

CONCLUSION

Due to high prevalence and multifactorial etiology of dry eye in diabetic patients, we recommend that diabetic clinics must include routine dry eye screening. Also apart from conventional treatment like lubricants, anti inflammatory and antioxidants, optimal glycaemic control should be an important consideration in the management of tear dysfunction in diabetic patients.

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