

ORIGINAL RESEARCH**Assessment of prevalence of dry eye diseases in diabetic patients**¹Dr.Shreyanshi Sharma, ²Dr.SushilOjha

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ABSTRACT:

Background: Diabetic patients might exhibit dry eye symptoms probably due to neuropathy, metabolic dysfunction, or abnormal lacrimal secretions. The present study was conducted to assess prevalence of dry eye diseases in diabetic patients.

Materials & Methods: 92 diabetic patients of both genders were enrolled. Ocular examinations, fasting blood sugar (FBS), postprandial blood sugar, and glycosylated hemoglobin estimation (HbA1c) were recorded. Dry eye patient was diagnosed with the help of slit-lamp examination, Schirmer's test, tear film break-up time (BUT), and Rose Bengal staining technique. Gradation of dry eye was done by the following standard protocol.

Results: Dry eye was present in 70 and negative in 22. The mean duration of diabetes was 11.4 years in positive cases and 5.6 years in negative cases. The difference was significant ($P < 0.05$). Grade was mild in 32, moderate in 20 and severe in 18 patients. The difference was significant ($P < 0.05$). Age group (years) <50 years had 24, 50-60 years had 30 and >60 years comprised of 16 patients. Blood sugar control (HbA1c) was good in 12, fair in 10, action suggested in 28 and poor in 20 patients. The difference was significant ($P < 0.05$).

Conclusion: There was high prevalence of dry eyes in diabetic patients. Grade of dry eyes was mild, moderate and severe.

Key words: Dry eyes, diabetes mellitus, Glaucoma.

INTRODUCTION

The global prevalence of diabetes mellitus (DM) in 2013 was 8.3%. In India, the prevalence was reported 2.1% in urban population and 1.5% in the rural population whose age was 40 years or more. The prevalence of diabetes was 5% in urban and 2.8% in rural areas in 2007.¹ The refractive changes, cataract, nerve palsies, retinopathy, glaucoma, and macular edema were the common ocular morbidities arising from diabetes. However, the ocular surface dryness, foreign body sensation, burning sensation, and grittiness of the eye also have been reported. It has been documented in literature that 18–70% of the patients with diabetes develop dry eye disease.²

Diabetic patients might exhibit dry eye symptoms probably due to neuropathy, metabolic dysfunction, or abnormal lacrimal secretions. Damage to the microvasculature of the lacrimal gland accompanied by autonomic neuropathy might impair lacrimation in persons who suffer from diabetes for a long time. Patients with diabetic retinopathy do not complain of symptoms of dry eye, but they have pathological and clinical signs of Keratoconjunctivitis Sicca.³

Etiopathogenesis of dry eye in diabetes can be explained in terms of the factors related to peripheral neuropathy secondary to hyperglycemia, insulin insufficiency, inflammation, autonomic dysfunction, and altered enzyme aldose reductase activity. Some researchers also claimed that dry eye in diabetes can be caused by diabetes- induced histological alteration in lacrimal gland and hyperglycemia-related oxidative stress. The severity of dry eye is dependent on the duration, control, and grade of diabetic retinopathy.^{4,5} The present study was conducted to assess prevalence of dry eye diseases in diabetic patients.

MATERIALS & METHODS

The present study comprised of 92 diabetic patients of both genders. The consent was obtained from all enrolled patients.

Data such as name, age, gender etc. was recorded. Ocular examinations, fasting blood sugar (FBS), postprandial blood sugar, and glycosylated hemoglobin estimation (HbA1c) were recorded. Dry eye patient was diagnosed with the help of slit-lamp examination, Schirmer's test, tear film break-up time (BUT), and Rose Bengal staining technique. Gradation of dry eye was done by the following standard protocol: Measurements of ≤ 10 mm were considered to be positive. Readings > 10 mm were considered as negative. BUT of ≤ 10 s was considered as positive indicative of dry eye and > 10 s was considered as negative. An additive score of total four or more in the eye constituted a positive test. Less than this value was considered as a negative test. Dry eye was graded into three categories such as mild, moderate, and severe. Mild dry eye was defined in patients who have a Schirmer's test of 6–10 mm in 5 min and T BUT ≤ 10 –6 mm in 5 min. Moderate dry eye was defined as a Schirmer's test of 3–5 mm in 5 min. Severe dry eye was defined as a Schirmer's test of ≤ 2 mm in 5 minutes. Data thus obtained were subjected to statistical analysis. P value < 0.05 was considered significant.

RESULTS

Table I Distribution of patients

Dry eye	Number	Duration in years	P value
Positive	70	11.4	0.01
Negative	22	5.6	

Table I shows that dry eye was present in 70 and negative in 22. The mean duration of diabetes was 11.4 years in positive cases and 5.6 years in negative cases. The difference was significant ($P < 0.05$).

Table II Grade of dry eyes

Grade	Number	P value
Mild	32	0.04
Moderate	20	
Severe	18	

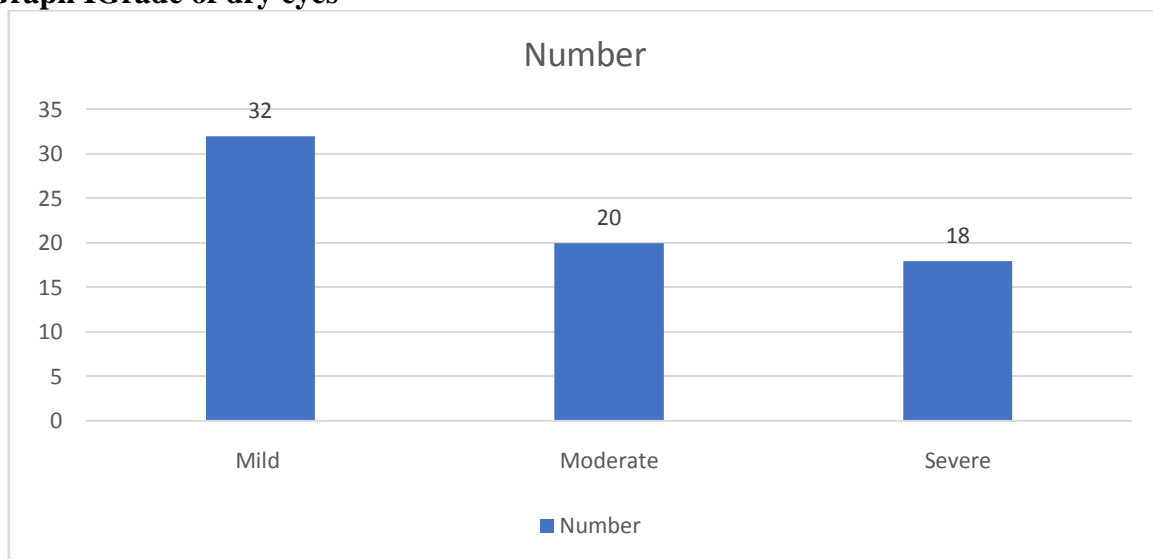
Table II, graph I shows that grade was mild in 32, moderate in 20 and severe in 18 patients. The difference was significant ($P < 0.05$).

Table III Association of dry eyes with variables

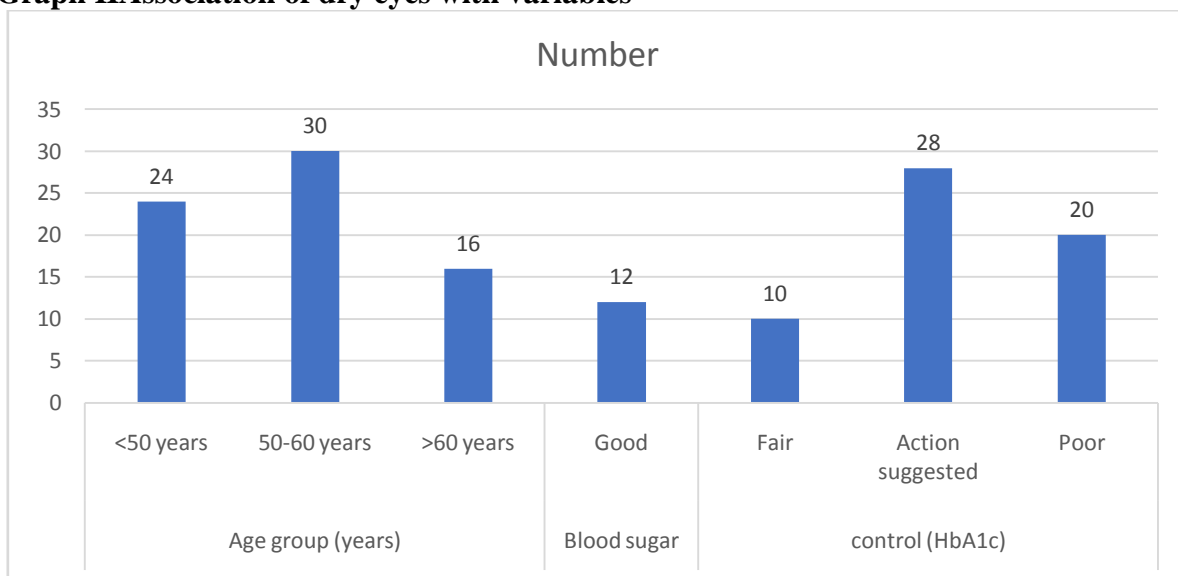
Parameters	Variables	Number	P value
Age group (years)	<50 years	24	0.05
	50-60 years	30	
	>60 years	16	
Blood sugar control (HbA1c)	Good	12	0.01
	Fair	10	
	Action suggested	28	
	Poor	20	

Table III, graph II shows that age group (years)<50 years had 24, 50-60 years had 30 and >60 years comprised of 16 patients. Blood sugar control (HbA1c) was good in 12, fair in 10, action suggested in 28 and poor in 20 patients. The difference was significant (P< 0.05).

Graph I Grade of dry eyes



Graph II Association of dry eyes with variables



DISCUSSION

Dry eye syndrome (DES) is very common among the general population with 28% of the adult patients. The discomforts of dry eye patient may have burning sensation, foreign body sensation, stickiness, watering, red eye, and blurring of vision. It may give rise to ocular complications such as keratoepitheliopathy and keratitis.⁶ Diabetic retinopathy (DR) and diabetic cataracts are well-known complications, dry eye syndrome (DES), also referred to as keratoconjunctivitis sicca, is also common in the diabetic population.⁷ Studies have indicated 54% prevalence of asymptomatic and symptomatic DES, in diabetes. However, the relationship between diabetes and DES still remains unclear.⁸ DES was recognized as a lacrimal function unit (LFU) dysfunction disease by the International Dry Eye Workshop in 2007. The LFU which protects and maintains the tear film and normal function of the ocular surface is composed of “the cornea, conjunctiva, lacrimal gland, meibomian gland, lids, and the sensory and motor nerves that connect them.”⁹ The present study was conducted to assess prevalence of dry eye diseases in diabetic patients.

We found that dry eye was present in 70 and negative in 22. The mean duration of diabetes was 11.4 years in positive cases and 5.6 years in negative cases. Sarker et al¹⁰ in their study found that the majority of the patients (58%) was female with female-to-male ratio of 1.38:1. Most of the patients (43%) were under 50 years followed by 51–60 years (34%). Overall, the mean age was 54.26 ± 10.06 years. More than half (63%) of the patients had duration of diabetes up to 5 years. The result showed 42% prevalence of DES among the patients. Number of patients had been suffering from mild, moderate, and severe dry eye were 21%, 16%, and 5%, respectively. The condition was pronounced with longer duration and poor control of diabetes.

We found that grade was mild in 32, moderate in 20 and severe in 18 patients. Kamel et al¹¹ evaluated prevalence of dry eye in type II diabetic patients and correlated the dry eye with the duration of the diabetes and the level of Glycosylated Hemoglobin (Hb 1Ac) in which 100 eyes (50 diabetics, 50 control) with type II diabetes mellitus. Dry eye was confirmed by tear film break up time (TBUT) and Schirmer I test. Results Schirmer and tear film BUT values were lower among the uncontrolled diabetic patients. There is highly statistically significant relation between severity of dry eye by Schirmer test with duration of diabetes, hypertension, Debris in tear film, degree of diabetic retinopathy, Glycosylated Hemoglobin (HbA1C), with P value 0.003, 0.044, 0.000, 0.000, 0.000 respectively. There is highly statistically significant relation between severity of dry eye by BUT test with duration of DM, HTN, Debris in tear film, DR, HbA1C.

We found that age group (years) <50 years had 24, 50-60 years had 30 and >60 years comprised of 16 patients. Blood sugar control (HbA1c) was good in 12, fair in 10, action suggested in 28 and poor in 20 patients. Ozdemiret et al¹² in his study found that TBUT and Schirmer's test values were significantly lower in diabetic patients compared with controls. In the diabetic group, more individuals had abnormal fluorescein stain compared with the control group ($P < 0.001$). Abnormal tear function tests were related with poorer metabolic glucose control and proliferative diabetic retinopathy ($P < 0.05$) but not with duration of diabetes ($P > 0.05$). It was concluded that poor metabolic control and proliferative diabetic retinopathy are high risk factors for ocular surface disorders in type 2 diabetes.

CONCLUSION

Authors found that there was high prevalence of dry eyes in diabetic patients. Grade of dry eyes was mild, moderate and severe.

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