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RESEARCH ARTICLE
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DRY EYE SYNDROME IN TYPE II DIABETES MELLITUS & ITS RELATION WITH SEVERITY OF DIABETIC RETINOPATHY.

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ABSTRACT:
Purpose: To study the prevalence of Dry eye in Type II Diabetes mellitus and its relation with severity of Diabetic Retinopathy.
Material & methods: This cross sectional study was conducted on 150 patients diagnosed with Type II Diabetes Mellitus. Ocular symptoms score of dry eye was calculated according to Dry Eye Questionnaire (DEQ-5). The following parameters were recorded: tear meniscus height (TMH), Schirmer's test 1, tear film breakup time (TBUT), and fluorescein staining of cornea and conjunctiva. A detailed posterior segment examination was done and Diabetic retinopathy if present was graded according to Early Treatment Diabetic Retinopathy (ETDRS) classification.
Results: 150 patients with mean age of 55.4 ± 9.32 years were assessed out of which 77 (51.3 %) patients were diagnosed to have dry eye syndrome. There was a statistically significant association of diabetes mellitus with age, duration and poor control of diabetes mellitus with $p<0.001$. Sex and severity of diabetic retinopathy had no significant association with dry eye syndrome.
Conclusion: This study highlights the significant correlation of dry eye syndrome with increasing age, longer duration and poor control of diabetes mellitus. Therefore, evaluation of dry eye should be included as an integral part of assessment of diabetic eye disease.

Keywords: dry eye, diabetes mellitus, diabetic retinopathy

INTRODUCTION

Diabetes mellitus (DM) is a complex metabolic disorder of carbohydrate, protein and fat metabolism in which there is relative or absolute deficiency of insulin leading to sustained hyperglycemia.[1] Diabetes mellitus is one of the leading causes of global morbidity and mortality. In India, the burden of DM is increasing steadily, with its prevalence increasing from 7.1% in 2009 to 8.9% in 2019.[2] Apart from the systemic impact of DM, it causes a spectrum of ocular manifestations like diabetic retinopathy (DR), diabetic papillopathy, glaucoma, cataract, and ocular surface diseases.[3] Diabetics are more prone to suffer from dry eye syndrome due to peripheral neuropathy, lacrimal gland dysfunction, inflammatory alterations and systemic hyperosmotic disturbances, secondary to hyperglycemia.[4] Dry eye syndrome can cause ocular discomfort, blurred vision, and in severe cases blindness. It can also interfere with the quality of life of the patient including physical, social, and psychological functioning with a negative impact on daily activities and workplace productivity.[5]

A timely diagnosis and early management can avoid these complications and prevent blindness. Therefore, this study was undertaken to study the occurrence of Dry eye syndrome in type 2 diabetic patients and its association with Diabetic retinopathy.

AIM

To study the prevalence of Dry eye in Type II Diabetes mellitus and its relation with severity of Diabetic Retinopathy.

OBJECTIVES

1) To study the prevalence of Dry eye in Type II Diabetes mellitus
2) To study the association of dry eye syndrome with severity of Diabetic Retinopathy.
3) To study the association between duration of diabetes mellitus and dry eye.

MATERIALS AND METHODS

This is a cross sectional study conducted on 150 patients with type II diabetes mellitus. Institutional Ethical Committee clearance was obtained in prior. Written informed consent was obtained from all the patients participating in the study.

Inclusion criteria:

1) Patients who gave written informed consent
2) Patients diagnosed with Type II diabetes mellitus of all age group and gender.

Exclusion criteria: 1) Patients with type I diabetes mellitus.

2) Patients with active ocular infection, ocular allergies, lid abnormalities, Contact lens wearers, history of ocular trauma of any kind and ocular surgery within last 2 years.

3) Patients diagnosed with Sjogren's syndrome, rheumatoid arthritis, Parkinson, Grave's disease and those on some medications like anti histaminic, anticholinergic, tricyclic anti-depressants, oral contraceptives, beta blockers and diuretics.

4) Patients who refuse to give consent.

Sociodemographic data, followed by a detailed history regarding diabetes – duration, type of treatment, overall control of diabetes (based on fasting and postprandial sugar levels and glycosylated hemoglobin [HbA1c] values) – was recorded. History of any other associated systemic disease and medications was obtained by direct patient interview and review of the available medical records. A validated Dry Eye Questionnaire (DEQ-5) of ocular symptoms related to dry eyes was used and symptom score was calculated. The visual acuity was recorded using Snellen's chart. A detailed anterior segment slit-lamp examination was done and the following parameters were recorded: tear meniscus height (TMH), Schirmer's test 2, tear film breakup time (TBUT). A detailed posterior segment examination was done with slit-lamp biomicroscopy using 90 D lens after pupillary dilation with 0.5% tropicamide eye drop, and diabetic retinopathy if present, was noted and graded according to Early Treatment Diabetic Retinopathy (ETDRS) classification.

Data was entered into MS excel sheet. Mean, ratio and percentages of the variables were calculated. The results were analysed by SPSS software and significance by p values was calculated using Chi square test. $P < 0.05$ is considered significant.

RESULTS

In this study, 150 patients with mean age of 55.4 ± 9.32 years were assessed out of which 77 (51.3 %) patients were diagnosed to have dry eye syndrome where 20.7% patients were having mild dry eye, 17.3% with moderate dry eye and 13.3% with severe dry eye (Table1, Fig 1). The frequency of dry eye syndrome was highest among the age group of >60 years followed by 51-60 years. Out of 77 patients with dry eye, 38 (53.52%) were males and 39 (49.36%) were females. There was a poor association between sex and frequency of dry eye syndrome (p=0.611). The mean duration of diabetes was found to be 7.04 ± 5.01 years among those diagnosed to have dry eye syndrome. The highest

frequency was seen in duration of 6-10 years (61.11%). The dry eye was significantly associated with age of patient (p<0.001), duration of diabetes (P <0.001) and poor control of diabetes (P <0.001) (Table2). Majority of the patients had no diabetic retinopathy (78%). Out of 33 (22%) patients with diabetic retinopathy, 16 (10.7%) had mild NPDR, 11 (7.3%) had moderate NPDR. Severe NPDR and PDR was present in 3 (2%) patients each. (Table3)

Table 1 : Distribution of patients with DM type II according to dry eye characteristics		
Dry eye	No of patients	Percentage
Absent	73	48.7%
Present	77	51.3%
Mild	31	20.7%
Moderate	26	17.3%
Severe	20	13.3%

Table 2: Association of dry eye with pertinent variables (n=150)			
Variables	No of patients (n=150)	Dry eye (n= 77) (%)	p- value
Age (years)			
35-40	8	0 (0)	<0.001
41-50	38	8 (21.05)	
51-60	63	32 (50.79)	
>60	41	37 (90.24)	
Sex			
Male	71	38 (53.52)	0.611
Female	79	39 (49.36)	
Duration of diabetes (years)			
<5	68	19 (27.94)	<0.001
6-10	54	33 (61.11)	
11-15	20	17 (85)	
>15	8	8 (100)	
Blood glucose control (HbA1c)			
Normal (<6%)	57	13 (22.80)	<0.001
Good control (6-6.4%)	40	22 (55)	
Fair control (6.8-7.65%)	26	20 (76.92)	
Poor control (>7.65%)	27	22 (81.48)	
Diabetic retinopathy			
Yes	33	21 (63.63)	0.109
No	117	56 (47.86)	

Table 3: Severity of Diabetic retinopathy related to Dry eye		
ETDRS	No of patients	Percentage
No DR	117	78%
Mild NPDR	16	10.7%
Moderate NPDR	11	7.3%
Severe NPDR	3	2%
PDR	3	2%

DISCUSSION

In this study, the prevalence of dry eye was 51.3% associated with type 2 diabetes mellitus. Majority of patients (20.7%) were having mild form. This was similar to study done by Hasan et al.[10] (20%

mild form) and Moss et al.[12] (19.8% mild form). The age group > 60 years had the highest frequency of dry eye syndrome (90.24%) which shows that the prevalence of dry eye syndrome increases with age. Similar results were seen in studies done by Reddy et al[9] and Kalaivani K[13]. Schultz et al.[14] suggested that increased evaporation, tear film osmolarity and autonomic dysfunction with age may be the cause for prevalence of dry eyes with increase in age.

There was no significant difference in prevalence of dry eye between male and females. The results corroborated with Mansuri et al.[8], Sarkar KC et al.[11], Hasan et al.[10] However, Moss et al.[12] showed more prevalence in females than males with diabetes mellitus. A significant association was found between duration of diabetes and prevalence of dry eye in this study, similar to other studies.[8.9.13] Hasan et al.[10] in their study stated no significant association between duration of diabetes mellitus and dry eye.

Kaiserman et al.[15] stated that good blood sugar regulation was important for prevention and control of DES among diabetic patients. This study showed that the control of blood glucose levels was statistically significant in association with prevalence of dry eye syndrome. Diabetic patients with poor glycemic control (HbA1c >7.65%) had more dry eye prevalence similar to other studies.[10,11] There was no significant association between the presence of dry eye and severity of diabetic retinopathy similar to Sarkar KC et al.[11] Reddy et al[9] and Manaviat et al.[16] have stated otherwise that dry eye was found to be more prevalent and severe in patients having PDR.

The limitations of study include the cross sectional nature, no long term follow up of patient to assess the association of dry eye with diabetic retinopathy and no control group without diabetes mellitus to compare the severity of dry eye.

CONCLUSION

All the diabetic patients should be evaluated for dry eye syndrome. It should be included as an integral part of assessment of diabetic eye disease. This study concludes that increasing age, longer duration of diabetes mellitus and poor control of diabetes was associated with higher prevalence of dry eye syndrome. Therefore, routine clinical screening of diabetic patients for dry eye and diabetic retinopathy, will help to prevent the future complications and reduction in quality of life associated with diabetic eye disease.

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None.

CONFLICTS OF INTEREST

None.

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