



Study Of Dry Eye Disease In Diabetics and Non-Diabetics – A Cross Sectional Comparative Study

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Abstract:

Introduction/Background: Diabetes is one of the important causes of blindness in both developed & developing countries. In the last fifteen years besides the commonly known complications, like cataract and diabetic retinopathy. Dry eye symptoms commonly seen in diabetics probably due to neuropathy, metabolic dysfunction or abnormal lacrimal secretions.

Materials and methods: As per inclusion criteria, 124 patients (age > 40 years) with the history of diabetes mellitus for more than 5 years were enrolled and 124 healthy subjects (age > 40 years) without history of DM were taken as a comparison group. Detailed anterior segment examination was done under slit lamp. Condition of lids, meibomian glands, conjunctival surface (dryness, wrinkling and sheen) and corneal surface was noted. Cornea was evaluated in detail for its sheen, surface (superficial punctate keratitis (SPK)/mucous plaques/filamentary keratitis).

Results: diabetes patients 70 eyes out of 124 eyes belonged to 40-60 years old group which is most in numbers (Table 1). Age between 60 -80 year 52 eyes out of 124 eyes and age more than 80 year 2 eyes out of 124 eyes, in percentage 56.5% of age 40- 60 year with dry eye in patients with diabetes mellitus and 44.7% of the diabetics belonged to age group between 60-80 years age. While 61.3% of non-diabetics were between age of 40- 60 years. The difference was found statistically insignificant (Table 2) with age (p value=0.28).

Conclusion: This study reports statistically significant correlation of dry eye in diabetic patients.

Key words: Diabetes, Dry eye, Cornea, Hyperglycaemia

Introduction:

Diabetes has become a major public health concern in current times. The global prevalence of diabetes was estimated in 2007 to be 246 million and could possibly reach 380 million by 2025 [1]. India leads the world in diabetic population and 77.2 million with pre diabetes group and estimated to have 62.4 million people with diabetes group includes controlled DM or uncontrolled DM [2]. By 2030 DM May affect up to 79.4 million population in India [3].

Diabetes is one of the important causes of blindness in both developed & developing countries [6]. In the last fifteen years besides the commonly known complications, like cataract and diabetic retinopathy, it was better characterized the relationship with dry eye disease (DED) and ocular surface disorders. Several clinical studies have demonstrated that people with DM are more vulnerable to dry eye than healthy subjects. [4-6]. Diabetic patients might exhibit dry eye symptoms probably due to

neuropathy, metabolic dysfunction or abnormal lacrimal secretions [5,7]. Chronic hyperglycemia, decreased insulin levels, systemic hyperosmotic disturbances, microvasculopathy and diabetic periphery neuropathy, are major risk factors for diabetes associated DED [8].

This study was conducted to compare and evaluate dry eye disease in diabetics with history of more than 5 years, with non-diabetics.

Materials & Methods:

A comparative cross sectional study was carried out from December 2020 to May 2021 in a tertiary care centre of central India. Ethical permission was obtained from the ethical committee of the institute. 124 patients (age > 40 years) with the history of diabetes mellitus for more than 5 years were enrolled. 124 healthy subjects (age > 40 years) without history of DM were taken as a comparison group. Diabetics and non-diabetics were excluded from the study those taking medications like anti-glaucoma, topical steroids, anti-hypertensives, anti-histaminics, anti-psychotics, and underwent ocular surgery in past 3 months, association with any other known systemic illness like {thyroid, collagen vascular disease, immunological disorders, lid diseases like ectropion, entropion, lagophthalmos.

All demographic data was collected. Detailed history regarding diabetes such as type of diabetes, duration, type of treatment, random blood sugar was recorded, and written informed consent was taken from all participants. Detailed anterior segment examination was done under slit lamp. Condition of lids, meibomian glands, conjunctival surface (dryness, wrinkling and sheen) and corneal surface was noted. Cornea was evaluated in detail for its sheen, surface (superficial punctate keratitis (SPK)/mucous plaques/filamentary keratitis). Sensation was recorded after Schirmer's test with a fine moist cotton wisp and graded as normal, reduced or absent.

The data was collected, entered and analyzed using EPI Info 7.1. Qualitative data was represented in form of frequency and percentage. Association between qualitative variables was assessed using the chi-square test. P value <0.05 was considered significant. Quantitative data was represented using mean \pm SD or median with range.

Results:

Table 1 shows study subjects according to the age groups, maximum no. of subjects belonged to 40-60 years old group, 61.3% among non diabetics and 56.5% among diabetics.

Table 2 shows 53.4 % of the diabetics with dry eye belonged to age group 40-60 years. Around 44.7% of the diabetics belonged to 61-80 years old age group. The difference was found to be statistically insignificant.

Table 3 shows statistically significant difference was found in dry eye among diabetic as compare to non diabetics. 11.2% in non diabetics had dry eye whereas 83% in the diabetics were suffering from dry eyes.

Discussion:

This study was conducted at a tertiary care center which included total 248 eyes among them 124 eyes of diabetic patients as case and 124 eyes of non-diabetic individuals as control.

In our study according to the age groups in diabetes patients 70 eyes out of 124 eyes belonged to 40-60 years old group which is most in numbers (Table 1). Age between 60 -80 year 52 eyes out of 124 eyes and age more than 80 year 2 eyes out of 124 eyes, in percentage 56.5% of age 40- 60 year with dry eye in patients with diabetes mellitus and 44.7% of the diabetics belonged to age group between 60-80 years age. While 61.3% of non-diabetics were between age of 40- 60 years. The difference was found statistically insignificant (Table 2) with age (p value=0.28). Similar results were postulated by Yoon et al, Manaviat et al and Hasan et al. [9-11] But studies like Moss et al. found significant association between age and dry eyes. Pakalpati et al. found that the prevalence of dry eyes in younger age group was 2.15 times more compared to older age group in Type I diabetics (p=0.468). [12,13]

This study have shown statistically significant (Table 3) difference was found in dry eye among diabetic as compare to non diabetics. 11.2% in non-diabetics had dry eye whereas 83% in the diabetics were suffering from dry eyes. Similar results were found by Nepp et al, Goebels M et al, Hom and De Land et al. [14-16] In studies like Moss et al, Inoue K et al, Kaiserman et al the prevalence of dry eye was low in diabetics

whereas in Shah et al study showed the prevalence of dry eye was high [12,17,18]. Recent studies by Sudha R, Praveen Kumar K V found 19% diabetics having dry eye and only 6% non diabetics had dry eye and Hada Y, Banait S stated 32.31% patients of diabetes of more than 5 year duration were found to suffer from dry eye. [19,20]

Conclusion:

On analysing study subjects according to the age groups, we found most number of eyes were belonged to 40-60 years old group, 56.5% among diabetics and 61.3% among non-diabetics. While among the diabetics, 53.4 % dry eye were belonged

to age group 40-60 years and 44.7% dry eyes were belonged to 61-80 years old age group. The difference was found statistically insignificant. Additionally we found statistically significant correlation of dry eye in diabetic patients. Hence we concluded that dry eye status non-significantly associated with age, and prevalence of dry eye is higher in patients of diabetes.

Considering increased prevalence of dry eyes, early ocular examination in Diabetic patients should be done for early detection of the ocular surface disorders.

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Tables:

Table 1: Distribution of study subjects based on the age groups

Age group (Years)	Non-diabetics (%)	Diabetics (%)
40 - 60	76 (61.3)	70 (56.5)
60 - 80	46 (37.1)	52 (41.9)
> 80	2 (1.6)	2 (1.6)
Total	124 (100)	124 (100)

Table 2: Prevalence of dry eye in diabetics based on age groups

Age groups (years)	Dry eye	
	Present (%)	Absent (%)
40 - 60	55 (53.4)	15 (71.4)
61 - 80	46 (44.7)	6 (28.6)
> 80	2 (1.6)	0
Total	103 (100)	21 (100)
Chi Square	2.4	
Degree of freedom	2	
P value	0.28	

Table 3: Comparison of dry eye among Diabetics & Non-diabetics

Study subjects	Dry eyes		
	Present (%)	Absent (%)	Total (%)
Non-diabetics	14 (11.2)	110 (88.7)	124
Diabetics	103 (83)	21 (16.9)	124
Total	117	138	
Chi square	150		
Degree of freedom	1		
P value	0.03		