



TO STUDY SEVERITY OF DRY EYE IN PATIENTS WITH DIABETES

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ABSTRACT

Diabetes is a serious long-term metabolic disorder that develops when the body cannot utilize the insulin which is produced, due to inadequate insulin synthesis or resistance. Diabetes patients have high levels of tears tonicity and ocular surface inflammation which cause dry eye. So our aim is to assess the burden of dry eye disease among individuals with diabetes. **Material and Methods** - The study included 200 diabetic patients. Detailed ocular and systemic history was taken and recent result of their HbA1c also recorded. They undergo comprehensive ophthalmic examination and dry eye status was evaluated with Schirmer's test, TBUT, TFMH, Fluorescein and lissamine green stain were graded as mild, moderate and severe. **Result** - Among 200 diabetic patients, male preponderance was observed with 58% of patients being males. The prevalence of dry eye was 52% among the patients with diabetes mellitus. Overall, 58 (29%) had mild dry eye, 26 (13%) had moderate dry eye, and 20 (10%) had severe dry eye. **Conclusion**- Dry eyes are often the consequence of defects in the ocular surface result from alterations of tear film, which are susceptible for a long duration of DM. Our study revealed that individuals suffering from diabetes often experience dry eye.

KEYWORDS : Dry Eye, Diabetes, Ocular Surface Disease, Tear Breakup Time, Schirmer's Test**INTRODUCTION**

Diabetes is a major cause of ocular morbidity as multiple mechanisms play a role in inducing inflammatory changes in the eye. The analysis shows that by 2045, the incidence of diabetes will have increased to 12.5%, 11.5%, and 10.9% globally, from 10.5%, 8.8%, and 9.6%, respectively, in Southeast Asia, India, and the rest of the world.¹

Besides the well-known complications, as cataract and diabetic retinopathy¹¹, in the past 15 years, prevalence of ocular surface disorders has been significantly increased. Among the ocular surface diseases, dry eye syndrome and blepharitis are the most common. Multiple mechanisms, such as ocular surface and lacrimal gland inflammation, neurotrophic deficiency, and meibomian gland dysfunction (MGD), play significant roles.

Dry-eye disease (DED)^{7,31} is a multifactorial ocular condition characterized by instability and loss of homeostasis of the tear film, ocular inflammation and damage, and neurosensory abnormalities. According to the Tear Film and Ocular Surface Society's Dry Eye Workshop II (TFOS DEWS II)⁷, it is usually classified as aqueous deficiency, in which there is a dysfunction of the lacrimal glands—evaporative, in which the most common cause is Meibomian gland dysfunction (MGD), and mixed forms.

Various mechanism which are responsible, among them both insulin resistance and hyperglycemia³ participate in the pathogenesis of diabetic dyslipidemia⁴, which is implicated in dry eye and ocular surface disease. Diabetes mellitus³ significantly lowers the lipid layer,^{7,8} of the tear film in addition to the most common and observable clinical findings of reduced tear secretion, instability of the tear film, altered goblet cell density, and diminished corneal sensitivity.^{7,8} Because of the loss of conjunctival goblet cells, corneal neuropathy lowers causes uncertainty in the tear film and lower values of the tear breakup time (TBUT). Patients with dry eye syndrome may experience burning, impaired vision, photophobia, and a feeling of gritty sensations.

MATERIALS AND METHODS

The cross-sectional study included 200 diabetes mellitus

patients (both new and review) who presented to the Dept. Of Ophthalmology and gave consent to participate in the study. It was conducted after emphasizing to the patient the importance of screening for dry eye. Before the assessment, the clinical tests that would be required to diagnose dry eye were performed and response was noted.

Inclusion Criteria- Patients giving consent for the study and who are known case of diabetes.

Exclusion Criteria- Patients with pterygium, who wore contact lenses, any corneal opacity due to trauma, patients who underwent any ocular surgery in past 3 months, who are using any chronic ocular drugs such as anti-histamines (olopatadine etc.) or are on any anti-depressants (citalopram, fluoxetine etc.).

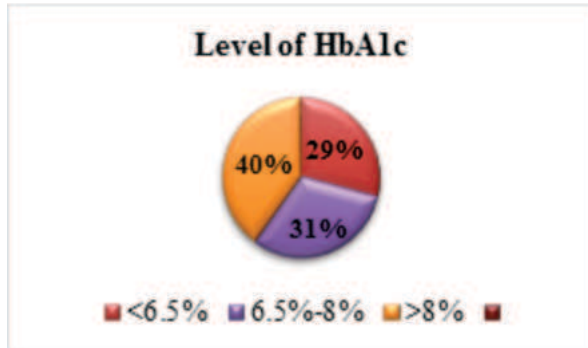
Detailed ocular examination was performed using slit-lamp examination following which dry eye was evaluated using schirmer's test, tear film breakup time, tear film meniscus height, conjunctival and corneal staining was done by fluorescein and lissamine green stain.

Data were entered into the excel sheet. Data were analyzed using the SPSS (Statistical Package for Social Sciences) 25.0 version. Data were analyzed for probability distribution using the Kolmogorov-Smirnov test. A comparison of categorical variables was done using the Chi-square test.

RESULT

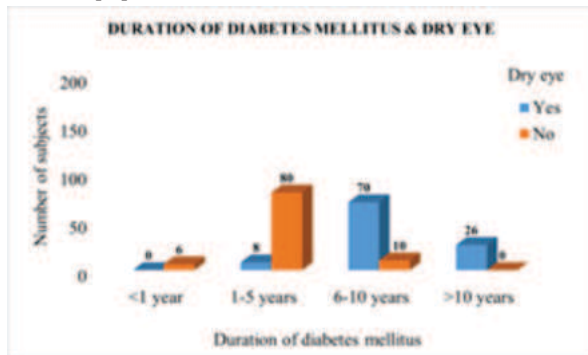
This study was conducted on 200 patients who have been diagnosed with diabetes. The mean-age group of patients was 51-60 years seen in our study with incidence of dry eye increases with age. Out of 200 patients 58% were males showing male predominance. In our study, majority of patients had diabetes since 5-10 years (n=94, 47%). With most of patients (40%) had HbA1c level of more than 8%. The majority of the subjects with HbA1c <6.5% did not have dry eye. HbA1c 6.5% to 8.0% was significantly associated with mild dry eye and HbA1c >8.0% was significantly associated with severe dry eye. In our study, fluorescein stain was positive in (22%), with Grade 1 (13%) followed by Grade 2 (7.5%) and Grade 3 in (1.5%). About 19% of patients had varying degrees of

conjunctival staining: 22 (11%) had Grade 1; 14 (7%) had Grade 2; and only 2 (1%) had Grade 3; while in 162 (81%) patients conjunctival staining was absent. On schirmer's test, highest values were obtained in no dry eye group, followed by mild dry eye, followed by moderate dry eye, followed by severe dry eye group.

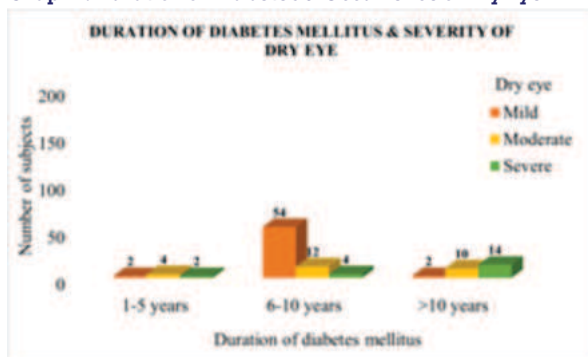


Graph1: Distribution of Patients According to Level of HbA1c

In our study, out of 200 patients we observed 52% (n=104) had dry eye among which maximum patients had mild dry eye in (n=58; 29%) followed by moderate dry eye in (n=26; 13%) and severe dry eye in (n=20; 10%).



Graph2: Duration of Diabetes & Occurrence of Dry Eye



Graph 3: Duration of Diabetes & Severity of Dry Eye

DISCUSSION

The current study intended to determine the positive correlation between ocular surface diseases, dry eye, and diabetes. It was distinctive that it included both a quantitative study of symptoms and a diagnosis of dry eye based on symptoms and clinical test results. Previous researcher diagnosed dry eye based on symptoms, with little attention given to the severity of the condition. The study also evaluated ocular surface staining techniques such as fluorescein staining for corneal erosions and lissamine green staining for conjunctival erosions.

Singh J et.al conducted a study on 250 patients, 138 (55.2%) of them were males. Ages ranged from 18 to 83 years, with a mean (SD) of 45.3 (16.9) years; 65 (26.0%) were aged between

18-30 years, 51 (20.4%) were aged 60 years or older, while the rest (134, 53.6%) were aged between 31-60 years. Baisoya P et al Out of all 503 patients, males accounted for the majority of cases (48.8%). Of the 235 patients who met the eligibility criteria, the greatest proportion (98, or 41.70%) were between the ages of 41 and 60. Similar was observed by Khetwani et al, Acharlu et al. and Sarkar et al concluded that the average age of patients was 54 ± 10.06 years, with 43% aged between 40 and 50 years.

The study's determined HbA1c value suggested that dry eyes (52%) were more common in DM patients with abnormal levels vs. normal levels. Patients (n=80) with poor glycemic control (HbA1c >8%) were significantly more likely to have dry eyes.

Kunj Naik et al also concluded that about 67% (n=24) of patients whose HbA1c levels were higher than 8% were diagnosed with dry eyes, and 68% (n=59) of patients whose diabetes had been present for more than ten years also had dry eyes. Kaiserman et al. and Seifart et al. established an association between HbA1c levels and the presence of dry eye syndrome. The higher the HbA1c values, the greater the risk of dry eye syndrome. Additionally, there was a strong positive association found between the duration of DM and the occurrence of dry eyes. He et al., Yoon et al., and Manaviat et al. all observed a similar conclusion. The prevalence of dry eye was observed 52% in our course of the study. In an identical research study by Nora Burda et al., dry eye was observed in 53% of patients; in subsequent studies by and Masood Reza Manaviat et al., and Nepp et al., dry eye was identified in 54% and 43% of patients, respectively.

It turned out that the prevalence of dry eye was greater in subjects with a longer history of diabetes, with 47% of patients with diabetes for 5-10 years and 13% of patients with diabetes for more than 10 years being diagnosed with dry eye. Similar correlation has been identified in other research by Kyung-Chul Yoon et al., where the values of test parameters were significantly out of normal limits in people with diabetes for more than 10 years. The duration of diabetes was significantly associated with dry eye. ($P = 0.01$). Similar results were observed in other studies Khetwani et al. established a statistically significant association ($P = 0.04$) between the duration of diabetes and dry eyes. Nasar et al. discovered a correlation between dry eyes and poor glycemic control ($P < 0.001$) and longer duration of diabetes ($P < 0.05$) in their study done in Tamil Nadu, India. Gannur et al. concluded that dry eyes were more common in patients with five years of DM (a 2.65-fold increase). Similar result was observed in our study.

CONCLUSIONS

Dry eyes are often the consequence of defects in the ocular surface resulting from alterations in the layer of tear film, which are susceptible to for a long duration DM. Our study revealed that individuals suffering from diabetes often experience dry eye. The duration of Type 2 diabetes is an important component in ocular surface problems. The present research concluded that those suffering from DM who have endured the condition for a longer duration encounter dry eyes more often than others. All cases of diabetes mellitus should be assessed for dry eye and damage to the ocular surface and this evaluation should be part of the screening process for diabetic retinopathy.

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