

## Original Research

### Analysis of incidence of dry eyes in diabetic patients

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#### Abstract

**Background:**The present study was conducted for assessing the prevalence of dry eyes in diabetic patients.

**Materials & methods:**This study involved 50 patients with Type 2 Diabetes Mellitus. The researchers:Assessed visual acuity and conducted slit-lamp examinations.Evaluated dry eye conditions using:-Schirmer test, - Tear Film Break-Up Time (TBUT), and - Ocular surface staining. Collected data systematically and analyzed it using Excel and SPSS software.The study likely aimed to investigate the prevalence or characteristics of dry eye conditions in patients with Type 2 Diabetes.**Results:**A total of 50 patients diagnosed with type 2 diabetes participated in the study, with an average age of 46.3 years. Of these participants, 62 percent were male and the rest were female. The prevalence of dry eyes among the cohort was noted to be 56 percent. Furthermore, an analysis using Pearson's correlation revealed that HbA1c levels, older age, and the duration of diabetes were significant risk factors linked to the development of dry eyes in individuals with type 2 diabetes.**Conclusion:**Dry eye syndrome can be caused by various factors, with aging being a common contributor. While the exact mechanisms are not fully understood, autonomic dysfunction may play a significant role in its development.

**Key words:** Dry eyes, Diabetes

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#### Introduction

Diabetes is a group of metabolic diseases characterized by hyperglycemia resulting from defects in insulin secretion, insulin action, or both. The chronic hyperglycemia of diabetes is associated with long-term damage, dysfunction, and failure of differentorgans, especially the eyes, kidneys, nerves, heart, and blood vessels.<sup>1, 2</sup>

Several pathogenic processes are involved in the development of diabetes. These range from autoimmune destruction of the  $\beta$ -cells of the pancreas with consequent insulin deficiency to abnormalities that result in resistance to insulin action. The basis of the abnormalities in carbohydrate, fat, and protein metabolism in diabetes is deficient action of insulin on target tissues. Deficient insulin action results from inadequate insulin secretion and/or diminished tissue

responses to insulin at one or more points in the complex pathways of hormone action. Impairment of insulin secretion and defects in insulin action frequently coexist in the same patient, and it is often unclear which abnormality, if either alone, is the primary cause of the hyperglycemia.<sup>3- 5</sup>

While 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. Studies have indicated 54% prevalence of asymptomatic and symptomatic DES, in diabetes. However, the relationship between diabetes and DES still remains unclear. This review aims to discuss the prevalence, etiology, and treatment strategies of diabetes mellitus associated DES and to emphasize the importance of early diagnosis and interventions in diabetes-associated

DES. Diabetes mellitus (DM) has been identified as one of the leading systemic risk factors for DES. The reported prevalence of DES in diabetics is 15–33% in those over 65 years of age and increases with age and is 50% more common in women than in men. The incidence of dry eye is correlated with the level of glycated hemoglobin: the higher the level of glycated hemoglobin, the higher the incidence of dry eye.<sup>6</sup> Hence; the present study was conducted for assessing the prevalence of dry eyes in diabetic patients.

### Materials & methods

This study investigated the prevalence of dry eyes in patients with Type 2 Diabetes Mellitus. A cohort of 50 patients was recruited, and comprehensive data on their medical history, demographics, and ocular symptoms were collected. The patients underwent thorough ocular

examinations, including visual acuity assessments and dry eye tests. The collected data were analyzed to determine the prevalence and characteristics of dry eye syndrome in diabetic patients, providing valuable insights into this common complication.

### Results

A total of 50 patients diagnosed with type 2 diabetes participated in the study, with an average age of 46.3 years. Of these participants, 62 percent were male and the rest were female. The prevalence of dry eyes among the cohort was noted to be 56 percent. Furthermore, an analysis using Pearson's correlation revealed that HbA1c levels, older age, and the duration of diabetes were significant risk factors linked to the development of dry eyes in individuals with type 2 diabetes.

**Table 1: Incidence of dry eyes**

| Dry eyes | Number | Percentage |
|----------|--------|------------|
| Present  | 28     | 56         |
| Absent   | 22     | 44         |
| Total    | 50     | 100        |

**Table 2: Risk factors of dry eyes**

| Risk factors         | r <sup>2</sup> -value | p-value             |
|----------------------|-----------------------|---------------------|
| HbA1c (%)            | 13.2                  | 0.003 (Significant) |
| Geriatric age        | 11.9                  | 0.001 (Significant) |
| Duration of diabetes | 8.5                   | 0.001 (Significant) |
| Male gender          | 1.8                   | 0.885               |

Pearson's correlation

### Discussion

Diabetes is a heterogeneous, complex metabolic disorder characterized by elevated blood glucose concentrations secondary to either resistance to the action of insulin, insufficient insulin secretion, or both. The most common classifications include Type 1 diabetes mellitus, Type 2 diabetes mellitus, and gestational diabetes. Type 2 diabetes (T2DM) is characterized by insulin resistance and a relative deficiency of insulin secretion. The absolute plasma insulin concentration (both fasting and meal-stimulated) usually is increased, although "relative" to the severity of insulin resistance, the plasma insulin concentration is insufficient to maintain normal glucose homeostasis. Insulin secretion capacity progressively worsens over time in most patients with T2DM. Type 1 DM results in an absolute deficiency in beta-cell function in most. Autoimmune destruction of beta-cells is a common origin, though cases continue to be classified as idiopathic. Gestational diabetes mellitus (GDM) is defined as glucose intolerance which is first recognized during pregnancy. In most women who develop GDM, the disorder has its onset in the third trimester of pregnancy and patients with GDM have a high risk of developing T2DM later in life. Other causes of diabetes

include genetic disorders, diseases that cause damage to the pancreas, as well as an excess of certain hormones such as growth hormone and glucocorticoids.<sup>8-10</sup>

A total of 50 patients diagnosed with type 2 diabetes participated in the study, with an average age of 46.3 years. Of these participants, 62 percent were male and the rest were female. The prevalence of dry eyes among the cohort was noted to be 56 percent. Furthermore, an analysis using Pearson's correlation revealed that HbA1c levels, older age, and the duration of diabetes were significant risk factors linked to the development of dry eyes in individuals with type 2 diabetes. Zou X et al evaluated the prevalence and clinical characteristics of dry eye disease (DED) in community-based type 2 diabetic patients and to identify the associated factors related with DED. A total of 1360 type 2 diabetic patients in the Beixinjing community were randomly selected. Of the 1360 subjects, 238 (17.5%) were diagnosed with DED. There was a significant association between the presence of DED and higher blood glucose as well as higher levels of glycosylated hemoglobin HbA1c. Corneal sensitivity was negatively correlated with the prevalence of DED. They concluded that the prevalence of DED in this community-based study was 17.5%, which was lower than that observed

in hospital-based studies. Diabetic patients with poor metabolic control were more likely to present with DED. A dry eye examination should be added to the routine screening of diabetes.<sup>11</sup>Ma A et al evaluated tear film stability and dry eye symptoms and their associations with systemic risk factors in Chinese patients with type 2 diabetes mellitus (T2DM). A total of 80 Chinese participants, aged 18 or above, with T2DM recruited from the specialist outpatient setting were included. The Oculus Keratograph 5M (Oculus Inc., Wetzlar, Germany) was used to measure the non-invasive tear break-up time (NITBUT). The age-adjusted prevalence of DES was 20% in the Chinese T2DM population. Their findings highlighted the importance of good glycaemic control as a modifiable risk factor for both dry eye symptoms and tear film instability in patients with T2DM.<sup>12</sup>Yazdani-Ibn-Taz MK et al assessed the relationship between patient-reported severity of dry eye disease (DED), quality of life (QoL), presence of diabetic retinopathy (DR) and length of disease duration in people with type 1 diabetes mellitus (DM1) and type 2 diabetes mellitus (DM2). A survey of 152 people (110 with and 42 without diabetes). All participants completed the Ocular Surface Disease Index (OSDI) and Dry Eye-related Quality of Life Score (DEQS) questionnaires. Forty-four percent of all diabetic subjects reported dry eye symptoms, compared to 29% in the control group. Routine clinical screening for severe DED could potentially allowed for a timely and more effective treatment and could contribute to mitigating the dry eye-associated reduction in QoL in those with DM2.<sup>13</sup>

## Conclusion

Dry eye syndrome can be caused by various factors, with aging being a common contributor. While the exact mechanisms are not fully understood, autonomic dysfunction may play a significant role in its development.

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