

Evaluation of incidence of dry eyes in diabetic patients

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ABSTRACT:

Background: Diabetes is a multifaceted metabolic disorder marked by persistent hyperglycaemia, which can result in both microvascular and macrovascular complications. Ocular complications associated with DM are progressive and rapidly becoming the world's most significant cause of morbidity and are preventable with early detection and timely treatment. Hence; the present study was conducted for assessing the prevalence of dry eyes in diabetic patients. **Materials & methods:** A cohort of 100 patients diagnosed with Type II Diabetes Mellitus and receiving treatment at the Ophthalmology Outpatient Department (OPD) was recruited for this study. Visual acuity was assessed using a Snellen chart, followed by a slit-lamp biomicroscopic examination. To evaluate dry eye conditions, the Schirmer test, Tear Film Break-Up Time (TBUT), and ocular surface staining with Fluorescein, Rose Bengal, or Lissamine green were performed. Data were systematically collected using a case report form, subsequently entered into Excel, and analyzed with SPSS software. **Results:** A total of 100 type 2 diabetes patients were enrolled. Mean age of the patients was 48.3 years. Among these 100 patients, 53 percent of the patients were males while the remaining were females. Incidence of dry eyes was 42 percent. While assessing the Pearson's correlation, HbA1c concentration, geriatric age and duration of diabetes were found to be significant risk factors associated with occurrence of dry eyes in type 2 diabetic patients. **Conclusion:** Dry eye syndrome can arise from a variety of factors. A prevalent cause of ocular dryness is the aging process. Although the precise mechanisms underlying dry eye syndrome remain ambiguous, it is possible that autonomic dysfunction plays a significant role.

Key words: Dry eyes, Diabetes

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INTRODUCTION

Diabetes is a multifaceted metabolic disorder marked by persistent hyperglycaemia, which can result in both microvascular and macrovascular complications. This hyperglycaemia is primarily due to either a relative or absolute deficiency of insulin. Generally, diabetes is categorized into two main types: immune-mediated diabetes, commonly referred to as type 1 diabetes, and non-immune-mediated diabetes, known as type 2 diabetes. This classification, however, tends to mischaracterize type 2 diabetes by failing to provide a clear pathophysiological explanation or a definitive positive description. In clinical practice, distinguishing between these two subtypes can often be challenging and may not be necessary; nonetheless, the lack of a clear positive definition underscores the complexities involved in succinctly describing type 2 diabetes.^{1,2}

Ocular complications associated with DM are progressive and rapidly becoming the world's most significant cause of morbidity and are preventable with early detection and timely treatment. Dry eye syndrome is a multifaceted disorder characterized by abnormalities in the tear film and the anterior segment of the cornea.³ These alterations in the ocular surface can result in discomfort and visual disturbances. In individuals with diabetes, there is an elevation in tear osmolarity and ocular surface inflammation, which contributes to the development of dry eye disease. Symptoms commonly experienced by patients include

a burning sensation, the feeling of a foreign body in the eye, photophobia, and blurred vision. Both dry eye disease and diabetes mellitus heighten the susceptibility to corneal infections and scarring; in severe cases, this may lead to corneal perforation and irreversible damage to the tissue.⁴⁻⁶ Hence; the present study was conducted for assessing the prevalence of dry eyes in diabetic patients.

MATERIALS & METHODS

The present study was conducted for assessing the prevalence of dry eyes in diabetic patients. A cohort of 100 patients diagnosed with Type II Diabetes Mellitus and receiving treatment at the Ophthalmology Outpatient Department (OPD) was recruited for this study. Data collection was conducted among those patients who consented to participate. Information was gathered following a structured proforma, which included a comprehensive medical history, details regarding any previous extraocular surgeries, and contact lens usage. A thorough history was obtained, encompassing demographic information such as age and sex, ocular symptoms, a detailed account of diabetes including its duration and management, as well as any history of allergies, medication intake, joint pain, chemical injuries, and Stevens-Johnson syndrome. Additionally, the presence of systemic diseases, prior ocular surgeries, trauma, contact lens usage, and ocular medications was documented. Visual acuity was assessed using a Snellen chart,

followed by a slit-lamp biomicroscopic examination. To evaluate dry eye conditions, the Schirmer test, Tear Film Break-Up Time (TBUT), and ocular surface staining with Fluorescein, Rose Bengal, or Lissamine green were performed. Data were systematically collected using a case report form, subsequently entered into Excel, and analyzed with SPSS software. Chi-square test and Mann Whitney test were used for assessment of level of significance.

RESULTS

A total of 100 type 2 diabetes patients were enrolled. Mean age of the patients was 48.3 years. Among these 100 patients, 53 percent of the patients were males while the remaining were females. Incidence of dry eyes was 42 percent. While assessing the Pearson's correlation, HbA1c concentration, geriatric age and duration of diabetes were found to be significant risk factors associated with occurrence of dry eyes in type 2 diabetic patients.

Table 1: Incidence of dry eyes

Dry eyes	Number	Percentage
Present	42	42
Absent	58	58
Total	100	100

Table 2: Risk factors of dry eyes

Risk factors	r ² -value	p-value
HbA1c (%)	23.25	0.001 (Significant)
Geriatric age	18.32	0.000 (Significant)
Duration of diabetes	19.71	0.000 (Significant)
Male gender	2.13	0.782

Pearson's correlation

DISCUSSION

Type 2 diabetes mellitus (T2DM) represents a growing global health challenge, intricately associated with the rising prevalence of obesity. Individuals diagnosed with T2DM face a heightened risk of both microvascular complications, such as retinopathy, nephropathy, and neuropathy, as well as macrovascular complications, including various cardiovascular diseases. This increased risk is primarily attributed to hyperglycemia and the various elements of the insulin resistance syndrome. Both environmental influences—such as obesity, poor dietary habits, and lack of physical activity—and genetic predispositions play significant roles in the complex pathophysiological changes that lead to disrupted glucose homeostasis in T2DM. While insulin resistance and diminished insulin secretion are the principal defects in this condition, at least six additional pathophysiological irregularities further complicate glucose metabolism regulation. The diverse pathogenic mechanisms involved in T2DM necessitate the use of multiple antidiabetic medications in combination to achieve and sustain normoglycemia. Treatment strategies must prioritize

not only efficacy and safety but also enhancements in the patient's quality of life. Numerous innovative pharmacological agents are currently under development, with a critical demand for those that improve insulin sensitivity, prevent the progressive failure of pancreatic β -cells typical of T2DM, and mitigate or reverse microvascular complications.^{7,8}

A total of 100 type 2 diabetes patients were enrolled. Mean age of the patients was 48.3 years. Among these 100 patients, 53 percent of the patients were males while the remaining were females. Incidence of dry eyes was 42 percent. Diabetic retinopathy represents the most prevalent ocular complication associated with diabetes and is the primary cause of blindness in individuals aged 20 to 64 years in the United States. Approximately 4 million Americans aged 40 and older with diabetes are affected by retinopathy, with nearly 1 million experiencing forms of the condition that pose a significant threat to vision. Major clinical studies have shown that stringent management of blood glucose levels and blood pressure can significantly decrease the likelihood of developing retinopathy and the risk of subsequent blindness.⁹Hence; the present study was conducted for assessing the prevalence of dry eyes in diabetic patients.

While assessing the Pearson's correlation, HbA1c concentration, geriatric age and duration of diabetes were found to be significant risk factors associated with occurrence of dry eyes in type 2 diabetic patients. Manaviat MR et al assessed the prevalence of dry eye syndrome and diabetic retinopathy (DR) in type 2 diabetic patients and their contributing factors.¹⁹⁹ type 2 diabetic patients were consecutively selected. All Subjects were assessed by questionnaire about other diseases and drugs. Dry eye syndrome was assessed with Tear break up time tests and Schirmer. All the subjects underwent indirect ophthalmoscopy and retinal color photography. DR was graded according to early Treatment Diabetic Retinopathy (ETDRS) criteria.Of 199 subjects, 108 patients (54.3%) suffer from dry eye syndrome. Although dry eye syndrome was more common in older and female patients, this association was not significant. But there was significantly association between dry eye syndrome and duration of diabetes (P = 0.01). Dry eye syndrome was more frequent in diabetic patients with DR (P = 0.02). DR was found in 140 patients (70.35%), which included 34 patients (17.1%) with mild non proliferative DR (NPDR), 34 patients (17.1%) with moderate NPDR, 22 patients (11.1%) with severe NPDR and 25 patients (25.1%) with proliferative DR (PDR). There were significant relation between age, sex and duration of diabetes and DR.¹⁰

Sendecka et al. conducted a study to estimate the prevalence of dry eye syndrome and to investigate its associated risk factors. The research involved a cohort of 140 patients, aged between 24 and 93, who were diagnosed with dry eye syndrome. These individuals

received treatment at the Ophthalmology Clinic in Lublin from 1999 to 2001. The findings revealed a higher incidence of dry eye syndrome among female patients, particularly those over the age of 50, with 80% of cases occurring in females compared to 20% in males. The average age of female patients was 67.5 years, while that of male patients was 58.5 years. The participants represented 5.52% of the total patient population treated at the Anterior Segment Disorders Out-Patient Clinic. The prevalence rates of dry eye syndrome were recorded as 4.24% for females and 0.76% for males in 1999, 5% and 1.6% in 2000, and 5.12% and 1.1% in 2001, respectively. Among the female patients with dry eye syndrome, 36% were diagnosed with systemic diseases, including 22.3% with rheumatoid arthritis and 9.8% with Sjogren's syndrome. In contrast, 46.6% of male patients had systemic conditions, with 32% diagnosed with rheumatoid arthritis and 7% with Sjogren's syndrome. The most commonly identified general medical conditions in the patient group included arterial hypertension (affecting both genders) and diabetes (predominantly in females). Additional potential risk factors for dry eye syndrome, such as smoking, living environment, other ocular diseases, and prior eye surgeries, were also examined, with smoking identified as a potential exacerbating factor for the condition.¹¹

CONCLUSION

Dry eye syndrome can arise from a variety of factors. A prevalent cause of ocular dryness is the aging process. Although the precise mechanisms underlying dry eye syndrome remain ambiguous, it is possible that autonomic dysfunction plays a significant role.

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