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**INTERNATIONAL JOURNAL OF
 ADVANCED RESEARCH (IJAR)**

Article DOI:10.21474/IJAR01/9382
 DOI URL: <http://dx.doi.org/10.21474/IJAR01/9382>



RESEARCH ARTICLE

THE PREVALENCE OF DRY EYE AND ITS RELATIONSHIP WITH HBA1C LEVELS AMONG PATIENTS ATTENDING A TERTIARY CARE HOSPITAL ATTACHED TO ANDHRA MEDICAL COLLEGE VISAKHAPATNAM, ANDHRAPRADESH, INDIA.

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Manuscript Info

Manuscript History

Received: 10 May 2019

Final Accepted: 12 June 2019

Published: July 2019

Key words:-

HBA1C, Schirmer's test, TBUT, OSDI, NPDR.

Abstract

Introduction: Dry eye is one of the most troublesome condition that produces symptoms like, ocular discomfort and visual disturbances which significantly affect the quality of life of patient. There is a marked variability in the prevalence rates of dry eye in world. The dry eye prevalence is much higher in Diabetics. HBA1C is an indicator of chronic persistent hyperglycaemia. Higher HBA1C levels are associated with higher complications rate associated with DM . This increased prevalence is due to diminished corneal sensitivity and increased reporting of the association of dry eye in diabetic patients.

The aim of this study: is to determine the prevalence and to estimate the correlation between dry eye and glycosylated haemoglobin in type two Diabetics in South India

Methods: It was descriptive hospital-based study conducted on 50 diabetic patients with symptoms of dry eye syndrome, presenting to the ophthalmology outpatient department regional eye hospital Vishakhapatnam, between June and July 2016 of both sexes above 40 years of age, of both urban and rural population. Dry eye was assessed by subjecting the patients to TBUT or Schirmer's test after taking the detailed history by using the standardized Ocular Surface Disease Index Questionnaire to the eligible respondents on dry eye symptoms. The diagnosis was confirmed by positive results of one or both the tests (TBUT or Schirmer's test) and correlated to recent HBA1C levels.

Results: Fifty Type 2 diabetic patients were studied, among which 31n are females and 19 n are males. Mild, moderate and severe forms of the dry eye are observed in Diabetic patients along with normal TBUT or Schirmer's test in some people. No statistically significant correlation was noted between dry eye and HbA1c. Dry eye is more prevalent in females and occurs at an earlier age than in men. In our study remarkable dry eye syndrome is present in 38% of cases (moderate and severe).

Conclusion: Dry eye is more common in patients of diabetes mellitus and is symptomatic in many but in ample no of cases it is asymptomatic also. Some patients may suffer from dry eye

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symptomseven with normal TBUT or Schirmer's test. There is no significant correlation was noted between dry eye and glycosylated haemoglobin (HbA1c).

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..... **Introduction:-**

Dry eye is a common ocular surface problem of multi factorial aetiology that leads to tear film instability and damages ocular surface due to inflammation. It affects all age groups but more common in older age group population. There is a marked variability in the prevalence rates of dry eye in world. The prevalence rate varies between 5 and 33% globally. The dry eye prevalence is much higher in Diabetics.

According to WHO, the global prevalence of diabetes among adults over 18 years of age has risen from 4.7% in 1980 to 8.5% in 2014. Diabetes prevalence has been rising, 2.6% of global blindness can be attributed to diabetes. Diabetes prevalence increased from 108 million in 1980 to 422 million in 2014, so that the prevalence of DES is also proportionately increased. The prevalence of DES in diabetes is around 54.3 %. This increased prevalence is due to diminished corneal sensitivity and increased reporting of the association of dry eye in diabetic patients.

Dry eye is most troublesome condition due disorders of the tear film, reduced tear production and/or excessive tear evaporation that produces symptoms like ocular discomfort and visual disturbances which significantly affects the quality of life of a patient (1). Diabetes is associated with numerous complications. Among the complications associated with diabetes poly neuropathy is important (PN). The cornea is densely supplied by nerve fibres from ophthalmic division of trigeminal nerve. In case of diabetic patients, the PN lead to nerve fibre damage of cornea leads to decreased corneal sensitivity. Uncontrolled diabetes is more commonly associated with complications among which ocular complications important as they may lead to blindness also. HBA1C is an indicator of chronic hyperglycaemia. The chronic hyperglycaemia is the main culprit of the diabetes associated complications. Patients may complain of symptoms of dry eye in the presence or absence of signs of the disease.(2)

Hence an attempt was made to identify DES among Diabetics and to establish the correlation between dry eye and glycosylated haemoglobin in type two Diabetics

Methodology:-

It was a descriptive hospital-based study conducted on 50 diabetic patients with symptoms of dry eye, presenting to the ophthalmology outpatient department of Government Regional eye hospital Vishakhapatnam, between June and July 2016 of both sexes above 40 years of age, of both urban and rural population. A detailed history was taken regarding, past medical history, systemic diseases, auto immune disorders, ocular history, duration of diabetes mellitus, use of insulin and a recent HbA1c report and demographic data. Anterior segment evaluation was done under slit lamp, visual acuity was recorded with or without glasses. After thorough examination of the fundus with 78 D, the selected patients were referred to cornea clinic where dry eye evaluation was conducted by using Schimer's test I, tear film break-up time [TBUT], corneal and conjunctival staining. The diagnosis was confirmed by positive results of one or both the tests (TBUT or Schirmer's test).

Then Patient's discomfort and visual disturbances were graded, by using ocular surface disease index (OSDI) questionnaire. Ocular Surface Disease Index (OSDI) questionnaire consists of 12 questions on "symptoms within the past week"

Symptoms of dry eye are ocular discomfort, like soreness, itchiness, redness, blurred vision gritty sensation which decreases with blinking, and excessive tearing and graded accordingly 0 to 100 from least severe to most severe. The score above 12 was considered as abnormal. The score more than 33 was considered as severe dry eye, between 23-32 as moderate dry eye and scores between 13 and 22 was considered as mild dry eye (3)

Inclusion criteria

Known type II diabetic patients without other systemic and ocular co morbidities were included

Exclusion criteria

Patients with vitamin A and D deficiency

1. chronic inflammatory and autoimmune diseases
2. Patients with eyelid abnormalities ,lacrimal and meibomian gland dysfunction
3. Sjogren's syndrome (primary, secondary) rheumatoid arthritis, Parkinson's disease, and SLE.
4. Microbial infections of eye
5. Patients on medications like antihistamines, oral contraceptives, antidepressants, and diuretics
6. Smokers
7. Patients who had undergone LASIK surgery.

Tear film break up time

Fluorescein strips were moistened with saline were introduced into the conjunctival sac. The individuals were instructed to blink several times for a few seconds. Then the tear film was examined with a broad beam with cobalt blue filter. The interval between the last complete blink and the occurrence of the first corneal black spot or line in the stained tear film was measured with the help of stop watch. A tear film break up time of more than 10 s was considered normal, where as a value of 8–10 s was considered mild dryness, a value of 5–7 s was considered moderate dryness, and a value less than 5 s was considered severe dryness.

Schirmer's test

Total tear secretion was measured by using Schirmer test I without topical anaesthesia. The tear secretion was measured in specified time. The strip was folded at the notch and inserted into the eye at the junction of the middle and lateral one thirds of the lower eyelids and kept in place for 5 min with patient's eyes closed. More than 10 mm of wetting after 5 min was considered normal, 8–10 mm of wetting indicates mild dryness, 5–7 mm of wetting indicates moderate dryness, where as values less than 5 mm of wetting were considered as severe dryness after 5 min.

Results:-

50 diabetic patients were included in this study. Among them 39(62%) patients were females and 19(38%) were males. The age group included in this study population was above 40 years. Major group was contributed by the patients of between 50 - 60 years age. Female diabetic population was complained of dry eye at an earlier age than men. Abnormal Schirmer I test and tear film break up time reports were present in 37 n of study population of both sexes. 19 patients showed mild dryness 12 patients showed moderate dryness and 6 patients showed severe dryness. Remarkable dry eye problem is present in (38%) of cases (moderate to severe dry eye). Diabetic retinopathy was detected in 14 patients (28%). Mild NPDR was detected in 6 patients (12%), Moderate NPDR was detected in 4 patients (8%), severe NPDR was observed in 3 patients (6%) and PDR was present in 1 patient (2%). Majority of the study population (62%) was having diabetes of more than 10 years. Good HBA1C levels were observed in 10 people and poor levels were observed in 6 people and in 34 people were having fair HBA1C levels. There was no correlation between glycemic control and dry eye was observed.

Gender distribution

Sex	%	Age in years
Male	19 (38%)	50-70
Female	31 (62%)	45 -70

Test results

Schirmer I test	N	%	BUT	%
Normal	13	(26%)	13	(26%)
Mild dryness	18	(36%)	19	(38%)
Moderate dryness	12	(24%)	12	(24%)
Severe dryness	7	(14%)	6	(12%)

Diabetics (N=50) (n%)

Duration of DM years	N	%
>10 years	31	(62%)
<10 years	19	(38%)

Diabetic retinopathy	
No retinopathy	36 (72%)
Mild NPDR	6 (12%)
Moderate NPDR	4 (8%)
Severe NPDR	3 (6%)
PDR	1 (2%)

Correlation Of HBA1C and Dry Eye Syndrome

HBA1C level	Normal N13 (%)	Mild dryness N 18 (%)	Moderate dryness N12 (%)	Severe dryness N7(%)
POOR($\geq 7.65\%$) 6n	0	0	3 (25%)	2(28.5%)
FAIR(6.8-7.6%)34n	0	4 (22%)	6 (50%)	5((71.4%)
GOOD(6-6.8%)10n	13 (100)	14((77.7%)	3 (25%)	0

Discussion:-

Dry eye syndrome is more prevalent in patients of Diabetes . It is a multifactorial ocular surface disorder in which tear film homeostasis is lost. Due to various reasons tear secretions are reduced in DM(4,5). This may be due to aging , aldose reductase pathway involvement ,and autonomic disfunction . Prevalence rates of DES varies in different parts of the world ranging between 27.7%-54.3% (6,7). The reduced reflex tearing ,decreased corneal sensitivity, excessive evaporation of tear film ,the mucin layer deficiency all contribute to DES in Diabetes .Tear film stability and break up time are also reduced in Diabetes which acts as an additive factor in the development of dry eye. Both BUT and Schirmir test values were low in diabetic group. In study conducted by Goebel both Schirmer's test I and II were markedly reduced in diabetic patients than in controls (37%, $P<0.001$). It was observed that dry eye was more common in female population 62% (31n) than male population 38% (19n)and dry eye also occurs early ,(<45 years of age)in females . But in study conducted by Kaisermann *et al.* (8) it was observed that there was no significant difference in dry eye symptoms between both sexes, although higher frequencies were found in females. In our study remarkable dry eye syndrome(moderate to severe) was present in 38% of cases . In our study, Schirmer's and TBUT values were lower among the uncontrolled diabetes patients which is an ominous sign. But some diabetics who complain of dry eyes were having normal tear secretion indicating that some other mechanism plays a role in the development of dry eye . In our study 26% showed normal tear film break up time but still complaining of dry eye. In study of Manaviat *et al.* (9) it was reported that 11.5% of patients showed abnormal tear break up time and Schirmer's test score even though there were no subjective symptoms of dry eye.

It was observed that even with good and fair HBA1C levels abnormal Schirmer and TBUT were observed which indicates that there is no correlation between HBA1C levels and dry eye syndrome .

Conclusion:-

Dry eye is more common in diabetes mellitus and is symptomatic in many . But in ample no of cases it is asymptomatic also .Some patients may suffer from dry eye symptoms even with normal TBUT or Schirmer's test. So there is need to screen the dry eye at the earliest possible time and to advise them to take necessary precautions in order to decrease the suffering of the patient .

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