A Cross Sectional Study to Evaluate the Prevalence of Dry eye & its Clinical Features amongst the Patients Visiting the Ophthalmic OPD of Tertiary Care Hospital in Ahmednagar District

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Abstract :

Background: Dry eye syndrome is now more appropriately referred to as DTS i.e. (Dysfunctional Tear Syndrome). Dry eye is a multifactorial disease of the tears and ocular surface that results in symptoms of discomfort, visual disturbance, and tear film instability with potential damage to the ocular surface. The number of patients presenting in Ophthalmology OPD with the symptoms of DTS are continuously increasing now a days. Aim: to evaluate the prevalence of dry eye and its clinical features amongst the patients visiting the Ophthalmic OPD of DVVPF's Medical college & Hospital, Ahmednagar. **Methodology:** it was Cross sectional observational study, included 200 patients who fulfilled inclusion criteria & after detailed history & ophthalmic examination. Study period was one year from January 2017 to December 2017, with convenience sampling method. **Results:** The study population in total was 200. The eyes included in the study were 388. The age group included in the study were from 21 to 70 years with mean age being 47.92 years. Of the total number of patients; 163 were females and 37 were males with male to female ratio 4.405. In this whole group, 97 patients (160) were diagnosed to have dry eye based upon tests.

The youngest patient was of 21 years and oldest patient was of 65 years. Mean age of patient was 47.97+/-11.55 years. There was significant association between the age groups and presence of dry eye (p = 0.028). With the advancement of age, prevalence of dry eye increased. In this study, there were 163 females and 37 males with the females to male ratio being 4.38:1. Presence of dry mouth, conjunctival congestion, corneal dryness & refractive errors were having significant association with the presence of dry eye. (p < 0.001). **Conclusion:** DTS evaluation with standard tests for dry eye helps in accurate diagnosis and treatment of the condition.

Key Words: Dry Eye, DTS, Prevalence, Clinical parameters in dry eye.

Introduction:

The definition of dry eye, in 1995, was given by National Eye Institute (NEI)/Industry Dry Eye Workshop. They stated that 'Dry eye is a disorder of the tear film due to tear deficiency or excessive evaporation, which causes damage to the interpalpebral ocular surface and is associated with symptoms of ocular discomfort.

Dry eye syndrome is now more appropriately referred to as DTS i.e. (Dysfunctional Tear Syndrome), based on the recommendations of a panel of experts who met at the Wilmer Eye Institute, John Hopkins University School of medicine, Baltimore.

Dry eye is a multifactorial disease of the tears and ocular surface that results in symptoms of discomfort, visual disturbance, and tear film instability with potential damage to the ocular surface. It is accompanied by increased osmolarity of the tear film and inflammation of the ocular surface.[1,2]

DTS can also be defined as a disorder that is characterised by either qualitative change or quantitative decrease in precorneal tear film resulting in variety of pathological changes that adversely affect the ocular surface resulting in ocular surface disorders which can lead to conjunctival squamous metaplasia and puncta epithelial erosion of cornea.[3,4]

Dry eye is defined as a disturbance of the Lacrima Functional Unit (LFU), an integrated system comprising the lacrimal glands, ocular surface (cornea, conjunctiva and Meibomian glands) and lids, and the sensory and motor nerves that connect them.[5]

Henry D et al Conducted a prospective clinical study titled "Evaluation of Topical Cyclosporine for the Treatment of Dry Eye Disease", on 158 patients age more than 21 years and above in 2008.They have reported the 72.1% improvement overall by use of cyclosporine.[6]

A Cross Sectional Study to Evaluate the Prevalence of Dry eye & its Clinical Features amongst the Patients Visiting the Ophthalmic OPD of Tertiary Care Hospital in Ahmednagar District

Dr. Sneha Murade *et al*

Samar K Basak et al had done a cross sectional study titled "Prevalence of dry eye diseases in hospital-based population in West Bengal, Eastern India" on 3023 patients with age more than 30 years and above in 2012.They reported the prevalence based on symptoms that is 40.8%.With symptoms and at least one sign(TBUT<10 seconds. RB staining score >4 and Schirmer's 1 test=5mm in 5 minutes) prevalence of dry eye was 26%.[7]

Anshu sahai et al conducted a cross sectional study titled 'Dry Eye: Prevalence and Attributable Risk Factors in a hospital based population' on 500 patients more than 21 years of age and above in 2005. They have found the prevalence of 18.4%.[8]

DA Schaumberg et al conducted a cross sectional study titled "Prevalence of Dry Eye Syndrome among US Women" on 39,876 women from 45-84 years in 2003. They have concluded that DES increases with age from 5.7% among women < 50 years old to 9.8% among women aged >75 years.[9]

Many studies worldwide have studied the prevalence of dry eye in patients visiting the ophthalmology department and found many other associated clinical factors like refractive errors, dry mouth, conjunctival dryness and corneal dryness.[10-14]

The number of patients presenting in Ophthalmology OPD with the symptoms of DTS are continuously increasing now a days. However, a better understanding of important presenting symptoms, the external and systemic factors contributing to dry eye and the ideal series of tests will help in early diagnosis of this chronic condition, with more efficient and effective treatment and long term patient satisfaction.

Methodology:

Aim of this study was to evaluate the prevalence of dry eye and its clinical features amongst the patients visiting the Ophthalmic OPD of tertiary care hospital in Ahmednagar district. Approval for the study protocol and clearance were obtained from the Institutional ethics committee, where the study was conducted. A total number of 200 cases were selected for the study and patient data was categorized into age, sex, history of drug allergy and systemic illness was analysed.

Study Design: Cross sectional observational study

Study Duration: January 2017 to December 2017.

Sampling Technique: Convenience sampling

Sample Size Calculation: According to a study conducted by Samar K Basak et al.[7] the prevalence of dry eye was 26% (so consider p= 26% & draw the study sample size). A minimum of 308 eyes (154 patients) should be included

in the study, but during our study period we got 200 patients (388 eyes) satisfying the study inclusion and exclusion criteria and they all were included.

Inclusion criteria:

1. Patients equal to and above 20 years
2. Burning sensation in eye
3. Sandy gritty feeling in eye
4. Foreign body sensation in eye
5. Photophobia
6. Heavy lids

Exclusion criteria:

1. Patients less than 20 years
2. Increased mucoid discharge and watery secretion suggestive of vernal keratoconjunctivitis, vitamin A deficiency
3. Alkali burns.
4. Ocular cicatricial pemphigoid.
5. Acute ocular infections
6. Trachoma.
7. Ocular surgery within past 6 months.

Written informed consent was taken before enrolling the patients in the study. All the patients were examined by taking a thorough and detailed history. Complete ophthalmic and medical history was inquired about. Anterior segment examination was done by slit lamp examination. IOP was measured using Schiotz or Goldmann's Applanation tonometer. Sac syringing was performed on both the sides. Fundus examination with direct ophthalmoscope in undilated pupil.

A complete slit-lamp examination of the lid margins, tear meniscus, conjunctiva, and cornea and tear film was done. Relevant examination of other important ocular structures was done. Following this, tests to diagnose dry eye were performed. These are tear break up time (TBUT), rose Bengal staining, Schirmer's tests and Lissamine Green staining were performed.

Participants were labelled as having dry eye if at least three out of these diagnostic tests were positive. This criteria of two diagnostic tests to diagnose dry eye was adopted in order to increase the detection rate of dry eye and hence arrive at an accurate prevalence.

Results:

The study population in total was 200. The eyes included in the study were 388. The age group included in the study were from 21 to 70 years with mean age being 47.92 years. Of the total number of patients; 163 were females and 37 were males with male to female ratio 4.405. In this whole group, 97 patients (160) were diagnosed to have dry eye based upon tests.

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Dr. Sneha Murade *et al*

Table 1: Characteristics of the study population

Characteristics	Number
Total number of patients	200 (388 eyes)
Schirmer's test positive	160
Tear Film Break Up Time TBUT	74
Rose Bengal Test Positive	146
Lissamine Green Test Positive	143
Dry eye Present (2 or more tests positive)	97 Patients (160 eyes)
Dry eye absent	103 patients (228 eyes)

Schirmer's test was positive in 160 patients, tear film break up time TBUT test was positive in 74 patients, rose Bengal test was positive is 146 patients, Lissamine Green Test was Positive in 143 patients. Using the criteria for diagnosing dry eye, dry eye was seen in 97 patients (160 eyes) that's 48.5% patients (160 eyes) and it was absent in 103 patients (228 eyes).

Table 2: Dry eye according to the age distribution

Age (In years)	Dry eye present number of patients (%)	Dry eye absent number of patients (%)	Total number of patients
21-30	0	14 (100 %)	14
31-40	17 (31.5 %)	37 (68.42 %)	54
41-50	23 (53.53 %)	20 (46.66%)	43
51-60	34 (60%)	23 (40%)	57
61-70	23 (72.72%)	9 (27.27%)	32
Total	97	103	200
		$X^2 = 9.089$	P=0.028

The whole study population was divided into subgroups according to the decade. Also, the relationship of age with prevalence of dysfunctional tear syndrome was studied. The youngest patient was of 21 years and oldest patient was of 65 years. Mean age of patient was 47.97+/- 11.55 years. There was significant association between the age groups and presence of dry eye (p = 0.028). With the advancement of age, prevalence of dry eye increased.

Table 3: Dry eye in relation to sex distribution

Sex	Dry eye present	Dry eye absent	Total
Female	83 (85.57%)	80 (77.67%)	163 (81.50%)
Male	14 (14.43%)	23 (22.33%)	37 (18.50%)
Total	97 (100%)	103 (100%)	200 (100%)
		$X^2 = 0.653$	P=0.419

In this study, there were 163 females and 37 males with the females to male ratio being 4.38:1. The dry eye was not associated with sex of the patients (p = 0.419).

Table 4: Dry eye in relation to other clinical features

Clinical Features	Dry Eye Present (97)	Dry Eye Absent (103)	Total (200)	P Value
Dry Mouth Present	34	14	48	<0.001
Dry Mouth Absent	63	89	152	
Conjunctival congestion Present	60	31	91	<0.001
Conjunctival congestion Absent	37	72	109	
Corneal dryness Present	42	1	43	<0.001
Corneal dryness Absent	65	102	167	
Refractive Error Present	69	46	115	<0.001
Refractive Error Absent	28	57	85	
All are significant, p < 0.001.				

Presence of dry mouth, conjunctival congestion, corneal dryness & refractive errors were having significant association with the presence of dry eye.

Discussion:

The total sample size in our study was of 200 patients and we found 97 patients to have dry eye evidence either in one or both eyes. The results were based on the positive results of at least two out of four objective tests that were included in the study. The prevalence of dry eye in this study was found to be 48.5% (97 out of 200 patients).

Basak SK et al. conducted a cross sectional study on 3023 patients with age more than 30 years and above in 2012.They have reported the prevalence based on symptoms that is 40.8%.With symptoms and at least one sign(TBUT<10 seconds. RB staining score >4 and Schirmer's 1 test=5mm in 5 minutes) prevalence of dry eye was 26%.[7]

The Salisbury eye study[8] stated a prevalence of 14.6% depending upon subjects reporting symptoms. The study was conducted by Sahai A et al and dry eye was present in 18.4% of the subjects included in the study. In a study in Indonesia which was a population based study, conducted by Lee AJ et al the prevalence of dry eye was found to be 27.5%.[15]

A Cross Sectional Study to Evaluate the Prevalence of Dry eye & its Clinical Features amongst the Patients Visiting the Ophthalmic OPD of Tertiary Care Hospital in Ahmednagar District

Dr. Sneha Murade *et al*

In our study, the percentage of people >40years who tested positive for dry eye was found to be 79.42%. The mean age of the people in our study was 47.91 years. The mean age in the study done by Khurana et al.[16] was 49.19 years The prevalence of dry eye was studied to significantly increase with increase in age of the patients (p=0.028) and it was found to be significantly higher in patients with age more than 40 years. This finding is similar to the study done by Moss et al.[17] which specified an association between old age and an increase in dry eye symptoms.

Our study concluded a higher prevalence of DTS in women when compared to men, which were similar to the findings of other studies. Moss et al.[17] had found out a prevalence of 16.7% in women as compared to 11.4% in men. The prevalence rates were obtained after adjusting for age. In a study conducted on hospital based population; Sahai A et al[8] found out the prevalence of 22.8% in women compared to 14.9% in men in their study.

The most common signs observed in this condition were Conjunctival congestion and corneal dryness. About 65.5% of all the patients with conjunctival congestion showed evidence of DTS. Thus, association between DTS and conjunctival congestion was found to be statistically highly significant (p< 0.001). Our findings were similar to the findings of Srinivas et al.[18] They also found an increased incidence of bulbar hyperaemia in women with dry eye; which may be used as one of the diagnostic signs for screening of the patients for evidence of DTS.

The term 'dry eye' can be attributed to the Swedish ophthalmologist Henrik Sjogren who described the triad of dry eye, dry mouth, and joint pain in the year 1934.[19] We found out in our study that 17.14% of the population had positive findings for both dry eye and dry mouth. Schein OD et al.[20] had done a population based study of dry eye and dry mouth and found that the dry mouth symptoms had increased with age, white race and in females.

In our study; we found that there was significant correlation between the presence of dry eye and refractive errors (p=0.027). Our findings are parallel to other studies (Sahai et al)[8] that have shown that when compared to emmetropic persons; prevalence of dry eye was much higher in those with both- corrected as well as uncorrected 86 refractive errors. Study by Jie Y et al.[13] showed that among people with under corrected refractive errors; there was significantly higher incidence of DTS.

Conclusion:

1. DTS is a seriously under-diagnosed ophthalmic condition. This is because diagnosis and assessment of this condition is complicated by the considerable variation in disease symptoms and signs plus lack of definitive diagnostic tests.

2. It is not an obvious condition and one has to be alert and keen in history taking and examination for its diagnosis.

3. Age of the patient is a single most important consideration as DTS is more common in elderly population.

4. At the same time, attention should also be paid to other factors such as gender, presence or absence of refractive error, other associated systemic diseases like rheumatoid arthritis, as DTS has positive correlation with these factors.

5. DTS evaluation with standard tests for dry eye helps in accurate diagnosis and treatment of the condition.

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A Cross Sectional Study to Evaluate the Prevalence of Dry eye & its Clinical Features amongst the Patients Visiting the Ophthalmic OPD of Tertiary Care Hospital in Ahmednagar District

Dr. Sneha Murade *et al*

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