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Original Research Article

A PROSPECTIVE STUDY AT A TERTIARY CARE CENTER ON THE CLINICAL PROFILE OF DRY EYE DISEASE

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Abstract

Background: Dry eye is a multifactorial condition of the tear film caused by insufficient tears or excessive evaporation of tears, which may cause damage to the ocular surface and be linked to sensations of ocular discomfort. This study aimed at the clinical profile of dry eye disease. **Materials and Methods:** It was a prospective study conducted in the Department of Ophthalmology in a tertiary care institute for a period of 3 months from October 2023 to December 2023. The research was approved by the institutional research ethical committee and was by the tenets outlined in the Declaration of Helsinki. After receiving informed written consent, the trial included 500 normally healthy people who had dry eye symptoms but had not had any prior treatment. **Result:** 240 (48%) were found eligible for this study as per tear parameters. The prevalence of dry eye in the present study was found to be 48%. In a total of 500 patient's prevalence of dry eye was maximum (66.27%) in the age group of 21 to 40 years in males (48.6%) with a mean age of 47.60±16.17 years. maximum patients 94 (39.1%) and 140 (58.3%) were seen with mild dry eye based on Schirmer's I and TBUT respectively. A maximum of patients 110 (45.68%) were seen with moderate severity of dry eye according to DEWS grading. **Conclusion:** The 48% prevalence of dry eye in the otherwise healthy population suggests that dry eye is an underdiagnosed condition. The diagnosis of dry eye can be misled by merely evaluating tear parameters.

INTRODUCTION

According to the National Eye Institute (NEI) industry workshop from 1995, dry eye is a multifactorial condition of the tear film caused by insufficient tears or excessive evaporation of tears, which may cause damage to the ocular surface and be linked to sensations of ocular discomfort.[1] The lacrimal function unit (LFU), an integrated system made up of the lacrimal glands, the ocular surface, the lids, and the sensory and motor neurons that connect them, is disrupted in dry eye. The evaluation of symptoms is a crucial step in the diagnosis of clinical dry eye and, with time, may offer a more comprehensive picture of the problem.[2]

Of the frequently used diagnostic tests, only a small number of standardized symptom questionnaires that are highly reproducible have been created for formal research reasons.

In addition to the questionnaire, several tests are used to assess dry eyes, such as the Schirmer's test, the Tear Film Break Up Time (TBUT), and Rose Bengal Staining.[3] The study's goals were to determine the prevalence of dry eye and assess the correlation between the condition's clinical characteristics and several tear metrics in a group of healthy individuals.

MATERIALS AND METHODS

It was a prospective study conducted in the Department of Ophthalmology in a tertiary care institute for a period of 3 months from October 2023 to December 2023. The research was approved by the institutional research ethical committee and was by the tenets outlined in the Declaration of Helsinki.

After receiving informed written consent, the trial included 500 normally healthy people who had dry eye symptoms but had not had any prior treatment. The study excluded patients with systemic conditions such as diabetes, hypertension, heart disease, thyroid disorders, rheumatoid arthritis, Sjogren syndrome, acute ocular infections with corneal or conjunctival pathology, contact lens wearers, and patients who had undergone extraocular or intraocular surgery.

Methodology-

All the patients having symptoms of dry eye underwent an interview in the form of a questionnaire adopted from the Dry Eye Workshop (DEWS)1 questionnaire which included five symptoms:

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Foreign body sensation, Dryness, Photophobia, burning sensation, and Blurred vision after prolonged reading.

The response was positive when the respondent stated that a symptom occurred occasionally, frequently, or always; it was negative when the symptom was claimed to occur infrequently or never. The symptom score was determined by calculating the answers to each question. Patients were split into two groups based on the information provided in the questionnaire:

Group I: Patients having any of the two symptoms of dry eye.

Group II: Patients having more than two symptoms of dry eye.

Every test was administered by the same examiner. Meibomian gland assessment, lid surface, and lid position were all part of the ocular examination. Every patient had Schirmer's test I, Slit lamp biomicroscopy, and best-corrected visual acuity (BCVA). Using a manual keratometer, the tear film thinning time (TTT) was measured by timing the deformation of the corneal membrane between two blinks.

Schirmer's examination: The procedure involved applying a Schirmer's strip (Whatman filter paper no. 41 5x 35 mm) to the intersection of the lower lid's middle and lateral thirds.

The Schirmer strip was taken off after five minutes, the wet strip was measured, and the dryness was categorized as mild (less than 10 mm), moderate (less than 5 mm), and severe (less than 2 mm). The duration of TBUT was measured in seconds, starting from the moment the eyelid opened until the first black spot emerged in between two blinks. Tear meniscus height (TMH) was measured on a slit lamp from the upper limit of the tear lake to the center of the lower lid in millimeters.

Based on the tear metrics and questionnaire, 240 patients were deemed qualified for this investigation. The dry eye was finally graded following DEWS.1

- Schirmer's score variable, TBUT variable, and grade 1 mild pain
- Schirmer's score <10mm, TBUT <10 sec, Grade 2-moderate discomfort
- Schirmer's score <5mm, TBUT <5sec, and Grade 3-severe discomfort
- Disabling discomfort of grade 4, TBUT instantaneous, Schirmer score less than 2 mm.

Statistical Analysis: Version 24.0 of the Statistical Package for Social Sciences (SPSS) software was used to analyze the data that was so collected. Data were expressed in terms of frequency and percentage using descriptive statistics. To prevent statistical problems arising from the correlation between the right and left eyes, each patient's measurements were evaluated solely from the right eye. Multiple comparison tests were used in the data analysis process. Tear parameters were compared and associated using multiple comparison tests and Pearson's correlation coefficient, respectively. A P value of less than 0.05 was considered statistically significant.

RESULTS

As per [Table 1] In this study, 500 patients were taken based on symptoms of dry eye. 240 (48%) were found eligible for this study as per tear parameters. The prevalence of dry eye in the present study was found to be 48%. In a total of 500 patient's prevalence of dry eye was maximum (66.27%) in the age group of 21 to 40 years in males (48.6%) with a mean age of 47.60±16.17 years. Out of 240 eligible patient's maximum of 100 (41.70%) patients were between the age group of 41 to 60 years. Males and females were 122 (51.92%) and 118 (48.08%) respectively.

As per [Table 2], revealed that maximum patients 94 (39.1%) and 140 (58.3%) were seen with mild dry eye based on Schirmer's I and TBUT respectively.

As per [Table 3] Maximum of patients 110 (45.68%) were seen with moderate severity of dry eye according to DEWS grading.

As per [Table 4], The mean standard values of Schirmer's test I, TBUT, TMH and TTT for mild, moderate, and severe dry eye were 16.44±6.15, 11.00±2.20, 0.52±0.11, 11.35±2.18, 14.12±6.26, 9.59±2.15, 0.37±0.12, 10.14±1.64. And 7.18±3.00, 7.43±1.77, 0.22±0.07, 8.00±1.28 respectively. The p values for all tear parameters were 0.01 which was statistically significant.

Table 1: Proportion of Dry eye according to age and gender

Sex	Total patients n=500 (%)	Eligible patients n=240(%)	Percentage (%)
Male	247 (49.7)	122 (51.92)	48.6
Female	253 (50.2)	118 (48.08)	44.66
Age			
<20year	33 (6.5)	8 (3.40)	24.24
21-40year	110 (22.4)	78 (31.91)	66.27
41-60year	169 (33.5)	100 (41.70)	57.98
>60year	188 (37.3)	54 (22.97)	28.72

Table 2: Tear Film Break Up Time and tear film breakup time to grade dry eye patients.

Grading of dry eye	Number of patients (n)	
	Schirmer's (mm/5min)%	TBUT (sec)%
Normal (>15)	78 (32.5)	5 (2)
Mild (10-15)	94 (39.1)	140 (58.3)

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Moderate (5-9)	58 (24.1)	92 (38.3)
Severe (<5)	10 (4.3)	3 (1.4)
Total	240	240

Table 3: Dry eye severity as per DEWS

Grading of dry eye	Number of patients(n)	Percentage %
Mild	84	35.74
Moderate	110	45.68
Severe	46	18.57
Total	240	100

Table 4: Correlation between Dry eye grading and Tear Parameters

Grading of dry eye	Schirmer's I (Mean±SD)	Tear film breakup time (Mean±SD)	T ear meniscus height (Mean±SD)	Tear film thining time (Mean±SD)
Mild (n=84)	16.44±6.15	11.00±2.20	0.52±0.11	11.35±2.18
Moderate (n=110)	14.12±6.26	9.59±2.15	0.37±0.12	10.14±1.64
Severe (n=46)	7.18±3.00	7.43±1.77	0.22±0.07	8.00±1.28
p* value	0.01	0.01	0.01	0.01

DISCUSSION

The current study's stated prevalence of dry eye is 48%, falling between 6.7% and 66.2%. According to Sahai et al., the maximum number of patients, 126 (53.61%), were in Group II and had more than two symptoms of dry eye. These abnormalities in the corneal surface may have been created at high altitudes by increased evaporation, low humidity, and winds, which resulted in inadequate wetting of the ocular surface.[3,5]

The patients in our study had a mean age of 47.60±16.17 years. As people aged, the prevalence of dry eye gradually rose. The age range of 41 to 60 years encompassed 98 (41.70%) patients, which aligns with the results of prior research.[6] The prevalence of dry eye was higher in males (122, 51.92%) in this investigation; a similar male preponderance was noted in a study by Tseng et al,[5] Excessive wind, sunlight, high temperatures, and air pollution were found to be strongly associated with dry eyes. The hot, dry air exacerbates dry eye symptoms such as grittiness, sandpaper feelings, and foreign body sensations, which may prompt the patient to consult a physician.[4] One modifiable risk factor for the etiology of dry eye disease is smoking. According to Gupta et al, there is no conclusive link between dry eye and systemic illness, oral or ocular medicine usage, alcohol or cigarette use, or exposure to these substances.[7]

According to Sahai et al, there is a theory that people with refractive errors tend to touch their eyes, which can lead to tear film instability in addition to introducing infectious materials, sweat, sebum, and particulate matter into the eye.[3] According to theories put out in studies by Sahai et al. and Gupta et al., the degree to which disease manifests itself depends in part on the existence of dry eye symptoms as well as environmental factors (such as temperature, humidity, wind, irritants, and contact lens wear).[3,7]

Early identification of dry eye disease depends on screening people in the preclinical stage who are symptomatic but show no signs of the condition. However, using just the symptoms will leave out a sizable portion of the dry eye patient population; therefore, a combined approach that includes both the symptoms and signs of dry eye is a crucial diagnostic tool.[8]

For mild, moderate, and severe dry eye, there was a substantial positive connection seen in the current study between all tear parameters (Schmirmer's I, TBUT, TMH, and TTT). This finding is consistent with Wang and Ibrahim et al.'s earlier observation of a positive association between TBUT and reduced TMH.[8-10] In line with the current investigation, Li et al. discovered a substantial association between lower tear meniscus and clinical measures such as TBUT, noninvasive TBUT, and Schirmer's I.[11]

On the other hand, because there is no consensus on the diagnostic criteria, available literature indicates that there is a weak link between the results of objective dry eye tests and the severity of dry eye. It can be difficult to understand the results of dry eye examinations due to low uniformity and the invasive nature of diagnostic testing, which further complicates the comparison of the findings. This might be because, as the investigations by Schein et al. indicated, there aren't any clear-cut values that allow one to distinguish between healthy and damaged eyes.[6] According to Cynthia et al., meibomian gland disease patients have larger tear volumes, which can result in more damage to the corneal epithelium because of different compositional alterations in tears.[12]

The study's main drawback was that it did not include any cases of severe corneal or conjunctival pathology, contact lens wearers, or systemic illnesses like diabetes, thyroid issues, rheumatoid arthritis, or Sjogren syndrome. The interpretation of the dry eye tests could have been challenging and ambiguous in these situations.

CONCLUSION

The 48% prevalence of dry eye in the otherwise healthy population suggests that dry eye is an underdiagnosed condition. The diagnosis of dry eye

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can be misled by merely evaluating tear parameters. It is possible to make an accurate diagnosis of dry eye using a combined approach that includes the use of clinical symptoms and several tear metrics. Depending on how severe dry eye is in the healthy population, there is a positive correlation between the clinical symptoms and different tear metrics.

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