



## Original Research Article

## Dry eyes, gritty or not?

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## ABSTRACT

**Purpose:** To study the prevalence of dry eye in a hospital-based population and to study the tear film parameters in dry eye patients presenting with symptoms of grittiness and foreign body sensation attending the ophthalmology outpatient department of Karpaga Vinayaka Institute of Medical Sciences, Chengalpattu, Tamil Nadu.

**Materials and Methods:** Cross Sectional study conducted in the out patient department of our department among patients presenting with symptoms suggestive of dry eyes both male and female patients consenting to the study were included.

**Results:** A total of 125 participants were enrolled, of these 38 had dry eye, 67 had long duration of work. 86 patients had complaints suggestive of dry eye. 38 had all 3 parameters tested abnormal. Tear film was evaluated with Schirmer test, TBUT, TMH and a proforma to record patient demographic details, symptoms, test values and dry eye diagnosis.

**Conclusion:** our study showed 86 participants with symptoms such as grittiness, foreign body sensation, dryness, burning sensation and 38 patients had dry eye and required treatment such as lubricants. Poor quality and function of tears, combined with subnormal ocular surface, makes patients symptomatic and on evaluation show ocular surface disease dry eye which can be treated accordingly to relieve the patient of symptoms and improve the quality of life. Thus routine and early examination of tear function and ocular surface parameters should form a part of the workup of all patients with symptoms of dry eye.

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## 1. Introduction

Keratoconjunctivitis sicca commonly referred to as Dry eye syndrome (DES), is frequently encountered in ophthalmology practice. Dry eye is a disorder of the tear film which occurs due to tear deficiency or excessive tear evaporation; it causes damage to the interpalpebral ocular surface and is associated with a variety of symptoms reflecting ocular discomfort.<sup>1</sup> DES is a multifactorial disorder due to inflammation of the ocular surface and lacrimal gland, neurotrophic deficiency and meibomian gland dysfunction.<sup>2</sup>

Knowledge of the pathophysiology of dry eye has recently been improved and the condition is now understood

to be a multifactorial disease, characterized by inflammation of the ocular surface and reduction in tear production.<sup>2</sup>

## 2. Aim

Our study aimed to study the prevalence of dry eye among patients presenting with the complaints of gritty sensation and foreign body sensation, to assess the tests used in diagnosis of dry eye and improve the quality of life by deciphering the different causes of dry eye in these individuals and treating them accordingly.

## 3. Materials and Methods

## 3.1. Study design

Cross Sectional study.

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### 3.2. Study setting

Out patient department, department of ophthalmology.

### 3.3. Study period

6 months.

### 3.4. Sampling method

Convenient sampling.

### 3.5. Inclusion criteria

All patients male and female above the age of 20 years with the complaints of grittiness, foreign body sensation, irritation, watering, dryness, burning sensation and for routine self check who presented to the out patient department

### 3.6. Exclusion criteria

Patients who were already diagnosed as DES, patients on lubricants for ocular surface disorders.

Study instruments: Tear meniscus height, Tear film breakup time (TBUT), Schirmer s test were employed to diagnose dry eye with complete ophthalmic examination, visual acuity and slit lamp examination was done.

### 3.7. Diagnostic criteria

1. Dry eye symptoms – grittiness, foreign body sensation, burning, dryness, itching, watering.
2. Schirmer test measures aqueous tear production - Schirmer test without anaesthesia - Whatman filter paper no 41. The patient is asked to look up and the strip is placed in the lower fornix at the junction of medial 2/3rd and lateral 1/3rd. The patient is asked to sit with eyes open for 5 minutes and the distance of the strip wetted is measured in millimetre and reading of 10 or lesser is considered abnormal.<sup>3,4</sup>
3. Tear meniscus height- tear meniscus will appear to be thin, less than 1 mm in height. 1% fluorescein dye strip – to measure the tear film meniscus height. Stain the precorneal tear film by placing the strip in the lower fornix at the junction of medial 2/3rd and lateral 1/3rd. The patient is placed in front of the slit lamp and using the cobalt blue filter, height of the fluorescent stained meniscus is measured.
4. Tear film stability can be assessed with the fluorescein tear break-up time test (TBUT). TBUT less than 10 seconds are classified as clinical dry eye. With the dye stained the patient is asked to blink few times then seated in a slit lamp and viewed under cobalt blue filter. The time taken to visualize the first dry spot on the cornea is noted with a stopwatch. Reading of 10 or lesser seconds is abnormal.<sup>3,4</sup>

## 4. Results

The study included 125 patients who consented to the study and the results were analysed from the data excel as follows. 53 were female and 72 were male patients.(Tables 1 and 2)

39 (31%) patients had no ocular complaints, 60 (48%) patients had less than 2 complaints and 26 (21%) patients had more than 2 complaints suggestive of dry eyes.(Figure 1)

The risk factors assessed in the study pertaining to dry eye were history of surgery, increased duration of work more than 8 hours per day and systemic illness namely diabetes and hypertension. 52(42%) patients had positive history of ocular surgery, 67(54%) patients had increased duration of work and 38(30%) patients had associated systemic illness. (Figure 2)

Tests done to evaluate and diagnose dry eye include Schirmer test, tear meniscus height and tear film break up time. Schirmer strip wetting of less than 10 mm in 5 minutes was considered as positive. TMH of less than 1 mm when examined in slit lamp was considered positive. TBUT less than 10 seconds was considered positive.(Table 3)

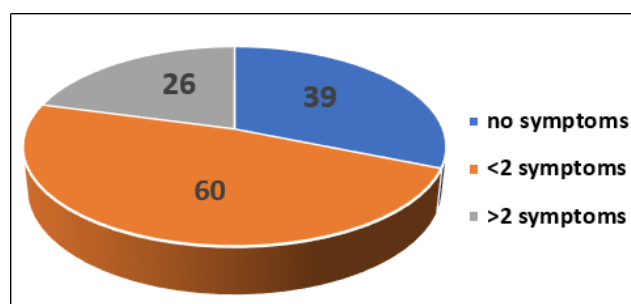
Dry eye was diagnosed when all 3 tests were positive, Schirmer, TMH and TBUT. 38 patients had all 3 tests positive. Prevalence of dry eye in our study was 30%.(Figure 3)

**Table 1:** Demographic details

Sex	Number of patients
Male	72 (58%)
Female	53 (42%)

**Table 2:** Age distribution of patients

Age distribution	Number of patients
20 – 40 years	51 (41%)
40 – 60 years	55 (44%)
More than 60 years	19 (15%)



**Fig. 1:** Ocular symptoms

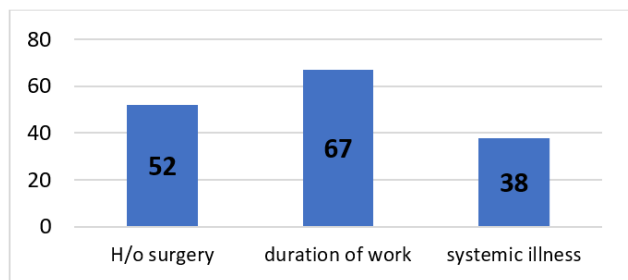


Fig. 2: Risk factors analysed

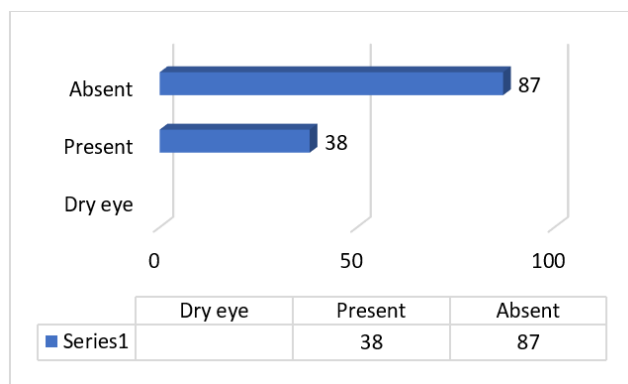


Fig. 3: Prevalence of dry eye

Table 3: Tests to diagnose dry eye

S. No.	Tests for dry eye	Number of test positive
1	Schirmer	48 (38%)
2	TMH	42 (34%)
3	TBUT	38 (30%)

5. Discussion

Dry eye syndrome (DES) is a chronic ocular pathology and a major global health problem that manifests as a plethora of symptoms such as burning, photophobia, tearing, and grittiness.<sup>5</sup> Several tests are available to diagnose DES however there is poor reliability and variability in analysis of tear film and ocular surface.

The study included 125 patients who consented to the study and the results were analysed from the data excel as follows. 42% were female and 58% were male patients. Increased health seeking attitude among males and delay in self care among female could be the reason for more male patients reporting.

Ocular symptoms make patients to seek ophthalmological consultation. 31% patients had no ocular complaints and had come for routine eye check, 48% patients had less than 2 complaints and 21% patients had more than 2 complaints suggestive of dry eyes.

Risk factors which are prone to develop dry eye were assessed. The risk factors assessed in the study pertaining

to dry eye were history of surgery, increased duration of work more than 8 hours per day and systemic illness namely diabetes and hypertension. 42% patients had positive history of ocular surgery either cataract surgery or pterygium excision, 54% patients had increased duration of work more than 8 hours of work in different fields including students, office job, computer operators, labourers and agriculturists. 30% patients had associated systemic illness. Diabetes mellitus has proven effects on tear film and its secretion and function leading to dry eye hence included in our study.

Tests done to evaluate and diagnose dry eye include Schirmer test, tear meniscus height and tear film break up time. Schirmer strip wetting of less than 10 mm in 5 minutes was considered as positive. TMH of less than 1 mm when examined in slit lamp was considered positive. TBUT less than 10 seconds was considered positive. Repeatable, reliable, simple and clinical methods routinely employed for diagnosing dry eye were used in our study.

Dry eye was diagnosed when all 3 tests were positive, Schirmer, TMH and TBUT. 38 (30%) patients had all 3 tests positive hence diagnosed with dry eye.

The prevalence of DES is greatly influenced by geographic location, climatic conditions, and lifestyle of the people and ranges from 5% to 35%.<sup>6-8</sup> The prevalence of DED in India is higher than the global prevalence and ranges from 18.4% to 54.3%.<sup>9,10</sup> The vast disparity in the prevalence of DES may be attributed to endemic geographic variations as well as the use of different diagnostic criteria by various studies. Our study was based on symptom leading to evaluation and diagnosis of DES thereby giving way for overestimation of the prevalence of DES.

Elderly people were found to be affected more as in earlier studies, due to probably more reporting to the out patient department while seeking medical help for systemic illness. Males were found to be affected more with DES

Diabetic patients are more prone to DES. Quantitative and qualitative abnormalities in tear secretion, alteration of epithelial barrier leading to poor adhesion of regenerating epithelial cells<sup>11,12</sup> autonomic neuropathy causing decreased corneal sensitivity lead to tear film and ocular surface changes in diabetes thus causing dry eye which can affect the quality of life of an individual.

Computer use and screen time was found to significantly influence outcome. Low humidity indoors, dry air, decreased blink rate causes easy desiccation and prevents spread of tear film over cornea. Increasing use of computers, laptops, tablets, smartphones and television has led to an increase in the prevalence of DES in the younger population.<sup>5</sup>

Contact lens use may cause dry eye or aggravate preexisting DES.<sup>13,14</sup> Nearly 50% of contact lens users may complain of symptoms of dryness, discomfort, grittiness, irritation, burning, or foreign body sensation.<sup>13,14</sup>

Smoking may affect the tear film stability as well as ocular surface sensitivity, and a significant association has been reported between smoking and DES.<sup>15</sup>

Symptoms associated with dry eye may include ocular burning, foreign body sensation, stinging sensation, pain, photophobia and blurred vision.<sup>16–19</sup> DES incidence is increased in elderly above 70 years, in occupational exposure to sun exposed work as in farmers

Commonest complaint in DES was grittiness followed by itching, burning and dryness and Schirmer and TBUT had significance in diagnosing dry eye.<sup>20</sup>

Comprehensive evaluation is needed before proceeding to treatment. Careful history with attention to diabetes, thyroid disorders, connective tissue diseases, ocular surgery, fall of foreign body, refractive errors and surgeries, contact lens wear, medications is warranted.

Slit lamp biomicroscopy to determine ocular surface status and diagnose associated meibomian gland dysfunction, blepharitis or meibomian seborrhoea examination of the tarsus and fornices for scars and symblepharon is important to exclude pre-existing Stevens-Johnson syndrome, other ocular surface inflammatory disease or previous infections. Conjunctiva and cornea evaluation to assess the severity of dry eye is mandatory.

Staining with lissamine green, rose Bengal is seen in severe cases of DES. Corneal filaments and edema may be observed in extremely dry eyes.

Severity of dry eye can be assessed by ocular surface dye staining. Fluorescein, lissamine green and Rose Bengal stains are used as diagnostic dyes. Fluorescein stains when the epithelial barrier is disrupted. Rose Bengal stains devitalized epithelial cells on the conjunctiva. Rose Bengal causes discomfort and irritation after instillation and may be less comfortable. Presence of strands and filaments in tear film over cornea is another feature of DES. Patients with dry eye syndrome may show signs of punctate epitheliopathy and corneal abrasions. Our study was restricted to simple clinical tests routinely done to detect dry eye in out patient department.

## 6. Conclusion

Dry eye is a wide spectrum of disease with different etiology and presentations. Proper history, investigation, simple clinical tests must be used by clinicians to assess the severity of this condition. The prevalence of dry eye was 30%. With prompt diagnosis and treatment patients can be symptom free with improved quality of life.

## 7. Source of Funding

None.

## 8. Conflict of Interest

The authors declare that there is no conflict of interest.

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