

# Association of Dry Eyes with Connective Tissue Disorder

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## Abstract

**Introduction:** Dry eye, or Keratoconjunctivitis sicca, is a multifactorial condition that affects the tear film and ocular surface due to abnormalities in the quality or quantity of the tear film which is commonly observed in systemic autoimmune disorders. The early recognition of disease and treatment provides a better visual function.

**Aim:** To study the incidence and factors influencing the expression of dry eyes in connective tissue disorders.

**Material and Methods:** It is a prospective cohort study of 100 patients of connective tissue disorders conducted in Tirunelveli Medical College Hospital. In this study, Schirmer's test, tear meniscus height, tear break up time, fluorescein stain, and rose Bengal stain were used to diagnose and grade dry eyes.

**Results:** Among 100 patients, 11 were diabetics, in which 5 were diagnosed to have dry eyes (45.5%). Among affected males, 4 had smoking history (66.6%). Among those affected, mild dry eyes seen in 16 patients (44.44%), moderate dry eyes in 12 patients (33.3%), severe dry eyes seen in 8 patients (22.2%).

**Conclusion:** Comorbid conditions, like smoking, menstrual irregularities are directly related to the severity of dry eyes and should be treated simultaneously.

**Key words:** Connective tissue disease, Dry eye, Menopause, Smoking

## INTRODUCTION

Dry eye, or Keratoconjunctivitis sicca, is a multifactorial condition that affects the tear film and ocular surface due to abnormalities in the quality or quantity of the tear film. This condition is accompanied by an increase in the tear film's osmolarity and inflammation of the ocular surface. Dry eye is commonly observed in systemic autoimmune disorders such as rheumatoid arthritis (RA), systemic lupus erythematosus, and Sjögren's syndrome (SS) with a prevalence ranging from 14.5% to 56%. This condition is characterized by symptoms of ocular irritation and discomfort, which affect functional visual acuity and the ability to work, read, use a computer,

and drive at night.<sup>1</sup> The majority of patients with SS are women, and the diagnosis is usually done when they are 40-50-year-old.<sup>2</sup> The presence of associated with systemic diseases like diabetes mellitus greatly affects the tear film function and stability. Decreased Schirmer 1 test values and shorter break up time (BUT) were positively correlated with the subjective severity of dry eye symptoms in type 2 diabetic patients.<sup>3</sup> Tear production and stability, surface dryness, and inflammation were significantly related to hormonal fluctuations in the menstrual cycle. Any impairment in normal menstrual cycle increases symptoms of dry eyes.<sup>4</sup> Dry eye also increases the risk of eye infection and destruction of ocular tissue. Ocular symptoms are correlated to systemic disease activity and can present as an initial manifestation of connective tissue disorder. The early recognition of disease and treatment provides better visual function.

## Aim

To find the incidence of dry eyes in connective tissue disorders and factors associated with expression of dry eye symptoms and severity.

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## MATERIALS AND METHODS

A prospective cohort study was conducted in Department of Ophthalmology, Tirunelveli Medical College Hospital. Institutional Ethics Committee and informed consent from the study patients were obtained. Patients with connective tissue disorder were included in the study. In this study, Schirmer's test Types I and II, tear meniscus height, tear BUT (TBUT), fluorescein stain, and rose Bengal stain were used to diagnose and grade dry eyes. Its severity is classified into mild, moderate, severe, and very severe (level 1 to 4) according to DEWS dry eye grading system. Mild-dry-eyes are diagnosed by the presence of mild irritation, dryness with variable Schirmer's, and TBUT without any other abnormalities. Moderate-dry-eyes are diagnosed by Schirmer's  $\leq 10$ , TBUT  $\leq 10$  with a variable amount of corneal and conjunctival staining and visual symptoms. Severe-dry-eyes diagnosed by Schirmer's and TBUT of  $< 5$  with marked corneal and conjunctival staining, filamentary keratitis, mucus debris, and visual symptoms. Very-severe-dry-eyes diagnosed by disabling visual symptoms with Schirmer's  $< 2$ , TBUT - immediate dry spot, filamentary keratitis, ulceration, increased tear debris, and keratinization.

## RESULTS

A total of 100 patients with connective tissue disorder were included, 90 females, 10 males. Among 100 patients, 54 were diagnosed to have RA, 24 were diagnosed to have systemic lupus erythematosus, 22 diagnosed to have other kinds of connective tissue disorders like systemic sclerosis, scleroderma with interstitial lung disease. Among females 30 (33.3%) were diagnosed to have dry eyes, among males 6 (60%) were diagnosed to have dry eyes. 15 affected females were in perimenopausal age group (40-50 years) (50%). Next, a common age group affected in females were 51 to 60 years old (30%). 6 out of 30 affected females had menstrual irregularities (20%). Among 100 patients, 11 were diabetics, in which 5 were diagnosed to have dry eyes (45.5%). Among affected males, 4 had smoking history (66.6%). Among those affected, 18 patients had a history of steroid intake (32.5%). Among 36 patients, mild dry eyes are seen in 12 patients (33.3%). Moderate dry eyes are seen in 16 patients (44.44%). Severe dry eyes are seen in 8 patients (22.2%). Among 36 affected patients 12 had defective vision of which 6 had cataract changes, 4 had hypermetropia, and 2 had myopia. Among severe dry eye patients who were treated with 0.1% tacrolimus eye ointment 5 showed improvement (62.5%).

## DISCUSSION

In our study, female patients were enrolled in higher number which is comparable with Usuba *et al.* study.<sup>1</sup>

Menstrual irregularities are associated with more expression of dry eyes due to hormonal factors which are comparable with Versura *et al.* study<sup>4</sup> which shows ocular surface changes during the menstruation. RA is three times a more common in females than males in our study which have a positive correlation with Choudhary *et al.* study.<sup>5</sup> Peri- and post-menopausal females were commonly affected in our study which is similar to Wenderlein *et al.* study<sup>2</sup> which shows a direct correlation with dry eye phenomenon and estrogen function (Table 1).

Diabetes as a comorbid factor for dry eyes was found to be significant which is compared with Eissa *et al.* study<sup>3</sup> (Table 2).

Effect of smoking was found to be an important risk factor in dry eyes by retarding tear secretion which is similar to Uchino *et al.* study<sup>6</sup> (Table 3).

About 0.1% tacrolimus eye ointment used in our study for severe dry eyes improved tear stability and ocular surface status which is correlating with Moscovici *et al.* study.<sup>7</sup> Among 36 patients, 66.62% were diagnosed only at the stage of moderate to severe dry eyes.

## CONCLUSION

Secondary dry eye syndrome is a chronic multifactorial condition. Comorbid conditions, like diabetes, menstrual irregularities are directly related to the severity of dry eyes and should be treated simultaneously. Therapies are mainly aimed to improve symptoms and for maintenance of

**Table 1: Distribution dry eye in female patients**

Menopause	Dry eye	
	Yes	No
Premenopausal	6	31
Perimenopausal	15	16
Postmenopausal	9	13

**Table 2: Distribution of dry eye in diabetic patients**

Diabetic history	Dry eye	
	Yes	No
Diabetics	5	6
Nondiabetics	31	58

**Table 3: Distribution of dry eye in smoking history**

Smoking history	Dry eye	
	Yes	No
Smoker	4	2
Nonsmoker	2	2

visual function. Screening of all connective tissue disorder patients for dry eyes and early intervention is needed to provide a better visual prognosis.

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