



# EVALUATION OF DRY EYE IN PATIENTS WITH PSORIASIS- A CASE CONTROLLED STUDY AT KLES DR. PRABHAKAR KORE HOSPITAL AND MEDICAL RESEARCH CENTRE, BELAGAVI.

Nagbhushan Chougule<sup>1</sup>, Dhruv Goyal<sup>2\*</sup>, Mitali Mangoli<sup>3</sup>, Bhavana Doshi<sup>4</sup>, Alex Ebnazar<sup>5</sup>, Shivanand C. Bubanale<sup>6</sup>, Smitha K.S<sup>7</sup>

## Abstract

**Introduction:** Psoriasis is a chronic, immune mediated inflammatory disease, affecting approximately 1–3 % of the world's overall population. The ocular manifestations of psoriasis are often neglected as skin and joint involvement are major causes of concern. Dry eye disease is an inflammatory disease that has many features in common with autoimmune disease.

**Aim and objectives:** To compare the severity of dry eye in patient with psoriasis and those without psoriasis.

**Materials and Method:** This was a 1 year hospital based case-controlled study done on 60 consenting patients clinically diagnosed to have psoriasis by the dermatologist: who were referred to our department and 60 patients without psoriasis or other co-morbidities. Evaluation for dry eye was done using Ocular Surface Disease Index (OSDI) questionnaire, Schirmer's I Test and Tear Film Break - Up Time and recorded. Statistical analysis was done by R i386 3.6.0 statistical software and Excel.

**Results:** A total of 60 psoriasis patients and 60 normal individuals were studied, male to female ratio was 2:1 in both the groups. The mean duration of psoriasis in our study was 9.43±8.69 years. Chronic plaque type of psoriasis was the most common type of psoriasis observed amongst the patients (81.67%). 70% (42/ 60) patients had dry eye manifestations. Dry eye was common in patients with PASI score > 10. There was no statistical significance between duration of disease and presence of dry eye in psoriasis.

**Conclusion:** Psoriatic patients have higher chances of tear film dysfunction and dry eye syndrome emphasising the need of periodic ophthalmological evaluation in them.

2254

**KeyWords:** Dry eye, Psoriasis, OSDI, PASI

**DOI Number:** 10.14704/NQ.2022.20.12.NQ77202

**NeuroQuantology2022;20(12): 2254-2258**

## Introduction

Dry eye disease is an inflammatory disease that has many features in common with autoimmune disease.<sup>1</sup> Psoriasis is a chronic, immune mediated inflammatory disease, with a genetic background and influenced by several environmental factors, affecting approximately 1–3 % of the world's overall population.<sup>2</sup> The ocular effects of psoriasis are often disregarded because they are also observed in many

other ophthalmic diseases and underlying psoriasis may be missed by a physician.<sup>3</sup> The most recent American Academy of Dermatology guidelines for the management of psoriasis and psoriatic arthritis contain no recommendations for ocular screening.<sup>4</sup> Therefore, ophthalmic involvement in psoriasis remains clinically underappreciated. In addition, the impact of psoriasis on the status of the ocular surface and the associated alterations still needs to be further elucidated.

**Corresponding author:** Dhruv Goyal

**Address:** <sup>1</sup>Assistant Professor, Department of Ophthalmology, Jawaharlal Nehru Medical College, Belagavi, <sup>2</sup>III year Post Graduate student, Department of Ophthalmology, Jawaharlal Nehru Medical College, Belagavi, <sup>3</sup>III year Post Graduate student, Department of Ophthalmology, Jawaharlal Nehru Medical College, Belagavi, <sup>4</sup>Professor and Head, Department of Dermatology, Jawaharlal Nehru Medical College, Belagavi, <sup>5</sup>Post Graduate student, Department of Ophthalmology, Jawaharlal Nehru Medical College, Belagavi, <sup>6</sup>Professor and Head, Department of Ophthalmology, Jawaharlal Nehru Medical College, Belagavi, <sup>7</sup>Professor, Department of Ophthalmology, Jawaharlal Nehru Medical College, Belagavi  
E-mail: dhruvgoyalnr@gmail.com



## Objective

The aim of this study was to compare the dry eye disease in patients of psoriasis and in individuals without any co-morbidities using Ocular Surface Disease Index (OSDI) questionnaire, Schirmer's I Test and Tear Film Break - Up Time.

## Study design

After approval from the institutional review board and ethics committee, this cross sectional, study was conducted in the ophthalmology department of our tertiary care hospital.

## Materials and Method

All patients, irrespective of age and sex, diagnosed with psoriasis by a dermatology specialist, based on the results of dermatological and histopathological evaluations with respect to treatment, type and area of involvement consenting to be a part of the study were included as per the universal sampling method. Those with history of smoking, current drug use that could affect the lacrimal functional unit, past history of significant ocular trauma or surgery, active ocular infection or allergy, ocular surface scarring, current contact lens usage and systemic disease other than psoriasis were excluded. A detailed record of patient particulars along with detailed psoriasis evaluation regarding the type of psoriasis, Psoriasis Area Severity Index (PASI score range being 0-72), duration of disease, site of psoriatic lesions and extent of skin involvement were noted. A second control group of 60 normal individuals with no other co-morbidities were also examined for dry eye.

Ocular evaluation was done with respect to the visual acuity, anterior segment examination using slit-lamp, funduscopy, Schirmer's-1, Tear film break up time (TBUT), intraocular pressure and the OSDI Questionnaire.

The resultant data is analyzed using statistical software R version 4.0.2 and Microsoft Excel. Categorical variables were given in the form of frequency (%). To check the dependency between categorical variables Chi-square test is used. P-value less than or equal to 0.05 indicates statistical significance.

## Results

A total of 60 psoriasis patients were studied in whom the mean age of the patients was  $47.73 \pm 12.28$  years, ranging from 19-74 years. Maximum patients belonged to the age group of 41-60 years

(56.67%). Out of 60 patients, 40 were males and 20 females with male to female ratio of 2:1. The mean duration of psoriasis in our study was  $9.43 \pm 8.69$  years. Minimum duration of psoriasis observed in the study was 2 months and maximum duration was 30 years. Chronic plaque type of psoriasis was the most common type of psoriasis observed amongst the patients 49/60 (81.67%). Mean PASI score of the enrolled patients was 11.13 in this study. As per the various tests to evaluate for dry eyes in the study subjects, 30% of the subjects were found to have lack of affection. The various descriptive attributes of study patients have been enlisted in table 1.

32 of the 60 patients had received prior ultraviolet phototherapy, and 20 of the 60 patients had been medicated with oral cyclosporine. 8 of the 60 patients were using topical ointment for the skin lesions. There was no significant association in those with prior phototherapy, cyclosporine medication or use of topical ointment and dry eye ( $P > 0.05$ ).

Of the total 60 patients of psoriasis, 70% (42/60) patients had dry eye manifestations. 11 patients had mild dry eye, 16 patients had moderate dry eye and 15 patients had severe dry eye. Dry eye was common in patients with PASI score  $> 10$  when compared to patients with PASI score  $< 10$ . Mean of PASI score was 11.13 in this study. The prevalence of dry eyes was higher among the patients with higher PASI score. There was no statistical significance between duration of disease and presence of dry eye in psoriasis. ( $p$ -value-0.9)

With respect to Schirmer's test for dry eye evaluation, a score of  $< 4$  indicative of severe dry eye was seen in 1.67% case (1/60), score 4-9 indicative of moderate dry eye was seen in 50% (30/60) cases, score of 9-14 suggestive of mild involvement in 18.33% (11/60) cases. Normal Schirmer's test with score of  $> 14$  was seen in 30% (18/60) of our study cases. The average Schirmer's test score was found to be  $13.20 \pm 9.50$ .

When Tear Break up Time (TBUT) test for dry eye evaluation was done, low i.e.  $< 5$  score was observed in 18.33% (11/60) cases. Marginal TBUT (5-10) was seen in (31/60 51.67% cases, whereas normal TBUT  $> 10$  was seen in 30% (18/60) cases. The mean TBUT score seen in our study patients was  $7.78 \pm 3.64$  (3,16).

Ocular Surface Disease Index (OSDI) scoring for dry eye evaluation showed a score of  $> 33$  indicative of severe involvement in 8.33% (5/60) cases. A score of 23-32 suggestive of moderate involvement was



seen in 43.33% (26/60) cases. Score of 13-22 indicative of mild involvement was seen in 18.33% (11/60) cases. Normal OSDI score of 0-12 was seen in 30% (18/60) cases. The mean OSDI score in our study patients was 20.52±9.48 (5,38)

In the control group, 60 individuals without psoriasis and without any other ocular or systemic condition were evaluated for dry eye. Out of the 60 individuals, 29 showed symptoms of dry eye. In these 29 individuals, 13 had symptoms of mild dry eye, 11 showed moderate dry eye and 5 individuals showed severe dry eye.

With respect to Schirmer's test, for dry eye evaluation, a score of < 4 indicative of severe dry was seen in 2/60 cases, score 4-9 indicative of moderate dry eye was seen 10/60 cases and a score of 9-14

suggestive of mild involvement in 17/60 cases.

When Tear Break up Time (TBUT) test for dry eye evaluation was done, low i.e.<5 score was observed in 5/60 cases. Marginal TBUT (5-10) was seen in 18/60 cases, whereas normal TBUT >10 was seen in 37/60 cases.

Ocular Surface Disease Index (OSDI) scoring for dry eye evaluation showed a score of > 33 indicative of severe involvement in (6/60) cases. A score of 23-32 suggestive of moderate involvement was seen in (10/60) cases. Score of 13-22 indicative of mild involvement was seen in (13/60) cases. Normal OSDI score of 0-12 was seen in 31/60 cases.

**Table 1: Descriptive statistics of variables in patients with Psoriasis**

Variable	Sub-category	Mean±sd/Frequency
Age		47.73 ± 12.28 (19,74)
Gender	Male	40 (66.67%)
	Female	20 (33.33%)
Type of Psoriasis	Chronic Plaque	49 (81.67%)
	Erythrodermic	2 (3.33%)
	Guttate	3 (5%)
	Psoriatic Arthritis	2 (3.33%)
	Pustular	4 (6.67%)
Duration of Psoriasis (in years)		9.43±8.69 (2 months, 30 years)
PASI score		11.13±7.01 (1.80,33.2)
Schirmer Test score	< 4 (Severe)	1 (1.67%)
	8-4 (Moderate)	30 (50%)
	9-14 (Mild)	11 (18.33%)
	≥ 14 (Normal)	18 (30%)
Schirmer Test score		13.20±9.50 (3.00,30)
TBUT category	< 5 (Low)	11 (18.33%)
	5-10 (Marginal)	31 (51.67%)
	>10 (Normal)	18 (30%)
TBUT		7.78±3.64 (3,16)
OSDI score category	>33 (Severe)	5 (8.33%)
	23-32 (Moderate)	26 (43.33%)
	13-22 (Mild)	11 (18.33%)
	0-12 (Normal)	18 (30%)
OSDI score		20.52±9.48 (5,38)

Abbreviations: - PASI: -Psoriasis Area and Severity Index, TBUT: - Tear Breakup time, OSDI: - Ocular Surface Disease Index.



**Table 2: Descriptive statistics of variables in patients without Psoriasis**

Variable	Sub-category	Mean±sd/Frequency
Age		47.73 ± 12.28 (19,74)
Gender	Male	40 (66.67%)
	Female	20 (33.33%)
Schirmer Test score	< 4 (Severe)	2
	4-9 (Moderate)	10
	9-14 (Mild)	17
	≥ 14 (Normal)	31
Schirmer Test score		
TBUT category	< 5 (Low)	5
	5-10 (Marginal)	18
	>10 (Normal)	37
TBUT		
OSDI score category	>33 (Severe)	6
	23-32 (Moderate)	10
	13-22 (Mild)	13
	0-12 (Normal)	31
OSDI score		

In the study, there were 60 subjects each with psoriasis and without psoriasis. Below table compares the distribution of some variables over groups.

**Table 3: Comparison variables over groups.**

Variables		Psoriasis	Without-psoriasis	p-value
Gender	Male	40 (66.67%)	40 (66.67%)	1
	Female	20 (33.33%)	20 (33.33%)	
Schirmer Test score	< 4 (Severe)	1 (1.67%)	2 (3.33%)	0.0009995*MC
	4-9 (Moderate)	30 (50%)	10 (16.67%)	
	9-14 (Mild)	11 (18.33%)	17 (28.33%)	
	≥ 14 (Normal)	18 (30%)	31 (51.67%)	
TBUT category	< 5 (Low)	11 (18.33%)	5 (8.33%)	0.002174*
	5-10 (Marginal)	31 (51.67%)	18 (30%)	
	>10 (Normal)	18 (30%)	37 (61.67%)	
OSDI score category	>33 (Severe)	5 (8.33%)	6 (10%)	0.01275*
	23-32 (Moderate)	26 (43.33%)	10 (16.67%)	
	13-22 (Mild)	11 (18.33%)	13 (21.67%)	
	0-12 (Normal)	18 (30%)	31 (51.67%)	

Abbreviations: MC: Monte-Carlo’s simulation.

By Chi-square test, there is no significant difference in the distribution of gender over groups.

There is significant association present between Schirmer’s test score, TBUT and OSDI score over groups by Chi-square test.

**Discussion**

In this study, the dry eye symptom was determined to be about 70% in psoriasis patients indicating a high incidence of dry eye in psoriasis patients. The

decrease in the TBUT was significant in psoriasis patients. The TBUT is generally used to assess tear film stability, and studies show that a shorter TBUT, as observed in our patients, can lead to ocular surface damage.<sup>4</sup>

Previous studies of patients with psoriasis have reported inflammatory ocular changes, such as blepharitis, conjunctivitis, uveitis, and ocular surface diseases, such as dry eye, which includes ectropion, trichiasis, conjunctivitis, conjunctival hyperemia, and corneal dryness with punctate keratitis and corneal melting.<sup>3</sup>



Cram et al reported that blepharitis, a common inflammatory condition of the eyelids, is the most prevalent ocular finding in patients with psoriasis.<sup>3</sup> The pathogenesis of both dry eye and psoriasis is not fully understood. Similar to dry eye, psoriatic skin shows evidence of immune-mediated inflammation induced by T-cells in the keratinocytes.<sup>3</sup>

Her et al suggested that a common denominator exists between dry eye and psoriasis. This commonality may be immune-mediated inflammation or L-arginine deficiency and increased  $\beta$ -defensin production, which are key factors in both psoriasis and systemic illnesses associated with dry eye.<sup>5</sup>

### **Conclusion**

Psoriasis have higher chances of influencing tear film function and psoriasis patients show tear film dysfunction and dry eye syndrome. Our study suggests that the ocular surface involvement in patients with psoriasis indicates the need of periodic ophthalmological examinations to diagnose the condition and allow a proper treatment and contribute to the improvement of patients' quality of life.

### **References**

- Messmer EM: The pathophysiology, diagnosis and treatment of dry eye disease. *DtschArzteblInt* 2015; 112: 71–82.
- Aragona E, Rania L, Postorino EI, et al. *Br J Ophthalmol* 2018;102:302–308.
- DEMIRCI, Goktug et al. Tear osmolarity and ocular surface parameters in patients with psoriasis. *Arq.Bras.Oftalmol.* 2017, vol.80, n.1 [cited 2019-10-15], pp.1-3.
- Her Y, Lim JW, Han SH. Dry eye and tear film functions in patients with psoriasis. *Jpn J Ophthalmol.* 2013;57:341-6.
- Jager K, Garreis F, Dunse M, Paulsen FP. Cationic amino acidtransporters and beta-defensins in dry eye syndrome. 2010;45:12-5.

