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Ocular Manifestations in Patients with Facial Seborrheic Dermatitis

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ABSTRACT

Seborrheic dermatitis (SD) is a chronic inflammatory disorder, especially including the periorbital region, which leads to different types of ocular surface abnormalities. **Objective:** To assess the prevalence and pattern of ocular manifestations in patients having facial SD and to evaluate its correlation with the severity of disease. **Methods:** An analytical case-control study was conducted from January 2024 to June 2025 in the Department of Dermatology and Ophthalmology at Al-Tibri Medical College and Hospital. Ninety-one patients with clinically diagnosed facial SD and ninety-one age and sex-matched healthy controls were enrolled in the study. All participants underwent a detailed ophthalmic examination, including TBUT, Schirmer's test, and slit-lamp evaluation. Data were analyzed by using SPSS version 26.0, and a p-value < 0.05 was taken as statistically significant. **Results:** Ocular symptoms were reported in 68.1% SD patients compared to 30.8% in controls ($p < 0.001$). Lid margin telangiectasia (50.5%), conjunctival hyperemia (48.4%), and meibomian gland dysfunction (57.1%) were significantly more common in SD patients (all $p<0.001$). Mean TBUT (6.2 ± 2.1 s) and Schirmer's scores (9.5 ± 4.3 mm) were lower in SD patients than in controls (13.1 ± 3.9 s and 14.8 ± 4.5 mm; $p < 0.001$). Disease severity showed a strong negative correlation with TBUT and Schirmer's test and a positive correlation with ocular surface staining ($p < 0.001$). **Conclusion:** Facial seborrheic dermatitis is frequently associated with significant ocular involvement. Early ophthalmologic evaluation is recommended.

INTRODUCTION

Seborrheic dermatitis (SD) is a chronic, relapsing inflammatory skin disorder which mainly involves sebaceous gland-rich areas like the scalp, eyebrows, nasolabial folds, retroauricular regions, and upper chest. It usually presents with erythematous, greasy, scaly patches, and patients often complain of itching and irritation, although the severity is not the same in all cases. The condition affects around 5% of the adult population worldwide. Higher prevalence has been reported in immunocompromised individuals and also in patients having neurological disorders such as Parkinson's disease and epilepsy [1]. Although SD is generally considered a dermatological condition, it is now becoming evident that its effects are not limited to the skin only. In recent years, ocular involvement has been increasingly recognized, particularly affecting eyelid margins and tear film stability. The periorbital region is commonly affected, likely due to dense sebaceous glands and their close anatomical relation with the ocular adnexa. In routine clinical practice, it is often seen that persistent facial inflammation extends

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towards eyelid margins and sometimes involves the meibomian glands as well [2, 3]. This extension has clinical importance; some recent studies have suggested that SD may contribute to blepharitis and meibomian gland dysfunction (MGD), both of which are important contributors to evaporative dry eye disease (DED) [4]. One important issue is that early ocular involvement is usually mild and often remains unnoticed either by dermatologists or even ophthalmologists. Despite this, patients may still complain of dryness, burning sensation, and fluctuating vision, which sometimes appear more disturbing than expected [5]. The pathogenesis of SD is not completely understood and is likely multifactorial. It involves Malassezia species, disturbance in lipid metabolism, inflammatory response, and genetic predisposition [6]. In an ocular context, Malassezia organisms have also been isolated from eyelid margins and meibomian gland secretions, which supports the concept that similar pathological mechanisms may also affect ocular tissues [7]. Chronic inflammation in these areas may lead to hyperkeratinization and blockage of gland orifices, eventually causing impairment of meibomian gland function and tear film instability. Apart from mechanical blockage, inflammatory mediators produced in SD may further worsen the ocular surface condition. These mediators contribute to epithelial injury, increased tear osmolarity, and subtle corneal surface changes, even when clinical signs are not very prominent [8]. Amitay-Laish *et al.* studied meibomian gland morphology using meibography and reported significantly more gland dropout with reduced tear breakup time (TBUT) in SD patients as compared to healthy controls [9]. Their findings suggest that ocular involvement is not incidental but part of the disease process. Similarly, Sampogna *et al.* observed higher eyelid margin scores, increased fluorescein staining, and more ocular surface damage in SD patients compared to those dry eye patients who do not have SD [10]. These observations further support that SD-related ocular changes are an extension of the same inflammatory process affecting both skin and ocular adnexa. At the mechanistic level, the inflammatory cascade in SD is thought to occur due to an imbalance between commensal and pathogenic microbes, particularly Malassezia furfur. These organisms produce lipase enzymes, which modify sebaceous secretions and generate pro-inflammatory fatty acids, leading to local irritation [11]. In the periocular region, this irritation may extend towards eyelid structures. Histopathological examination typically shows parakeratosis, follicular plugging, and infiltration of lymphocytes and macrophages, which confirms the inflammatory nature of the disease [12]. When this process involves ocular adnexa, the meibomian glands become functionally impaired. This results in reduced lipid secretion, increased tear evaporation, and destabilization of the tear film [13]. Clinically, patients with facial SD may present with eyelid redness, crusting, lash debris, and fine telangiectasia resembling features of anterior or posterior blepharitis. With longer disease duration, conjunctival congestion, punctate epithelial erosions, and occasionally corneal involvement may also be seen [14]. Although these ocular changes are usually mild to moderate, they should not be ignored. Symptoms may persist and can significantly affect patient comfort and visual quality. In some cases, especially when the disease is prolonged, secondary bacterial infection may occur, further worsening inflammation and tissue damage. Despite increasing recognition of this association, there is still limited data describing the complete pattern of ocular involvement in SD, particularly in South Asian populations. Regional factors such as environment, skin phototype, and treatment practices may influence disease presentation and outcome. Most of the available literature mainly focuses on cutaneous features, while detailed ophthalmic evaluation and tear film assessment are relatively less studied [15]. Alofi *et al.* in a recent review, reported that ocular involvement in SD ranges between 10% to 40%, which is quite a wide variation. This difference is likely due to heterogeneity in study populations and diagnostic methods [12]. The authors also emphasized that collaboration between dermatologists and ophthalmologists is important for early detection and better management of ocular manifestations. From a clinical point of view, recognizing ocular involvement in SD is important. If not properly managed, persistent inflammation may lead to chronic irritation, recurrent conjunctivitis, and, in severe cases, keratitis. Additionally, topical treatments used for SD, including corticosteroids and antifungal agents, may have ocular side effects when applied near the periocular region; careful use and follow-up are required [16, 17].

Despite the growing evidence, region-specific data regarding the prevalence and pattern of ocular manifestations in seborrheic dermatitis are still lacking, particularly from the South Asian region. Therefore, the present study aimed to evaluate the prevalence and pattern of ocular involvement in patients with facial SD and to assess its association with disease severity.

METHODS

This study was carried out jointly in the Department of Dermatology and Ophthalmology at Al-Tibri Medical College and Hospital during the period from January 2024 to June 2025, after obtaining ethical approval from the Institutional Review Board (ATMC/IERC/13th (01-2023)/27, dated 22nd May 2023). Written informed consent was taken from all participants before their inclusion in the study, and

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confidentiality of the data was maintained throughout. Patients aged 18 years and above, who were clinically diagnosed with facial seborrheic dermatitis, were included in this study. The diagnosis of seborrheic dermatitis was made based on classical clinical findings, including erythematous patches with greasy scales, mainly affecting sebaceous gland–rich areas such as the scalp, eyebrows, nasolabial folds, and periocular region. Patients having pre-existing ocular diseases not related to seborrheic dermatitis, history of previous ocular surgery, contact lens users, or those with systemic conditions like diabetes mellitus, autoimmune disorders, or thyroid dysfunction were excluded from the study, in order to reduce the confounding factors. Sample size was calculated by using the formula for cross-sectional studies: $n = (Z^2 \times p \times q) / d^2$, where Z value was taken as 1.96 for 95% confidence interval, p was the expected prevalence of ocular involvement, which was assumed as 30% based on previous studies, $q = 1 - p$, and d was the allowable margin of error (7%). The calculated sample size comes out to be 165.8, which was rounded, and after adding 10% non-response rate, the final sample size became 182 patients. Although this study was designed as a case-control study, the sample size was calculated using a prevalence-based formula due to a lack of prior local data. All the enrolled patients were subjected to detailed dermatological and ophthalmological examination. The severity of seborrheic dermatitis was assessed by using the Seborrheic Dermatitis Area and Severity Index (SDASI). SDASI scores were categorized as mild (<8), moderate (8–16), and severe (>16). Complete ocular examination was performed by a trained ophthalmologist, who was blinded to dermatological severity grading. Visual acuity was checked with Snellen's chart, followed by slit lamp examination of lid margin, meibomian gland orifices, conjunctiva, and cornea. Lid margins were examined for the presence of telangiectasia, redness, crusting, and irregular margins. Tear film stability was evaluated by Tear Break-Up Time (TBUT) using fluorescein dye, and values below 10 seconds were taken as abnormal. Schirmer's Test was performed without the use of anesthesia to assess basal as well as reflex tear secretion, and values less than 10 mm in 5 minutes indicate dry eye disease. Ocular surface integrity was assessed by fluorescein staining, and grading was done according to the Oxford grading system. Meibomian gland dysfunction (MGD) was assessed by evaluating meibum quality and its expressibility, and grading was done on a 0–3 scale. All observations were recorded in a pre-designed structured proforma.

Data was analyzed using SPSS version 26.0 (IBM Corp., Armonk, NY, USA). Quantitative variables such as TBUT and Schirmer's test score were presented as mean ± standard deviation (SD), whereas categorical variables, including lid margin changes, conjunctival hyperemia, and corneal staining, were expressed in the form of frequencies and percentages. Comparison between mild, moderate, and severe seborrheic dermatitis groups was performed using one-way ANOVA for continuous variables, while the Chi-square test was applied for categorical variables. Correlations between disease severity and ocular parameters were determined using Pearson's correlation coefficient, and a p-value less than 0.05 was considered significant. The study followed ethical standards of the Declaration of Helsinki, and confidentiality of participants' data was strictly maintained. All participants were informed about their right to withdraw at any stage.

RESULTS

Out of the total 182 participants, 91 were clinically diagnosed cases of facial seborrheic dermatitis, and 91 were age and gender matched healthy controls. The mean age of patients was 39.1 ± 12.7 years, while that of controls was 37.9 ± 11.8 years, showing no significant difference between the two groups. The male-to-female ratio was nearly similar, showing balanced gender representation in study groups. However, a considerably higher percentage of seborrheic dermatitis patients (68.1%) reported ocular discomfort as compared to only 21% of controls ($p < 0.001$) (Table 1).

Table 1: Demographic and Clinical Characteristics of Study Participants (n=182)

Variables	Cases (n=91, %)	Controls (n=91, %)	p-value
Age (years)	39.1 ± 12.7	37.8 ± 11.9	0.420
Gender			
Male	56 (61.5%)	54 (59.3%)	0.760
Female	35 (38.5%)	37 (40.7%)	
History of Ocular Discomfort	62 (68.1%)	28 (30.8%)	<0.001*
Itching/Burning around Eyelids	54 (59.3%)	20 (22.0%)	<0.001*

Independent Samples t-test & Chi-square test (χ^2) *Statistically significant ($p < 0.05$)

The ocular manifestations were found to be markedly more common among the seborrheic dermatitis group. Lid margin telangiectasia, conjunctival hyperemia, meibomian gland dysfunction, and lash crusting were seen much more frequently in cases than controls (all $p < 0.001$). These findings indicate a chronic inflammatory process extending from the facial skin towards the ocular adnexa and lid margins (Table 2).

Table 2: Comparison of Ocular Manifestations Between Cases and Controls (n=182)

Ocular Finding	Cases (n=91)	Controls (n=91)	p-value
Lid Margin Telangiectasia	46 (50.5%)	14 (15.4%)	<0.001*
Lid Margin Irregularity	40 (44.0%)	11 (12.1%)	<0.001*
Meibomian Gland Dysfunction	52 (57.1%)	16 (17.6%)	<0.001*

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Conjunctival Hyperemia	44 (48.4%)	12 (13.2%)	<0.001*
Corneal Punctate Erosions	24 (26.4%)	6 (6.6%)	0.001*
Ocular Surface Staining (≥ Grade 1)	41 (45.0%)	10 (11.0%)	<0.001*

Chi-square test (χ^2) *Statistically significant ($p < 0.05$)

Evaluation of tear film and meibomian gland parameters showed that seborrheic dermatitis patients had significantly reduced tear film stability and tear production when compared with the control group. The mean TBUT in cases was 6.2 ± 2.1 seconds as against 10.1 ± 2.8 seconds in controls ($p<0.001$). Similarly, the Schirmer's test value was lower in cases (9.5 ± 4.3 mm) than in controls (14.8 ± 3.6 mm, $p<0.001$). The mean corneal staining score was found to be higher in the seborrheic dermatitis group, suggesting the presence of surface epithelial damage, and the meibum quality score was also comparatively poorer, indicating underlying meibomian gland dysfunction (Table 3).

Table 3: Comparison of Tear Film Parameters Between Cases and Controls (n=182)

Parameter	Cases (n=91)	Controls (n=91)	Mean Difference (95% CI)	p-value
TBUT (seconds)	6.2 ± 2.1	13.1 ± 3.9	−6.9 (−7.82- −5.98)	<0.001*
Schirmer's Test (mm/5 min)	9.5 ± 4.3	14.8 ± 4.5	−5.4 (−6.53- −4.27)	<0.001*
Ocular Surface Staining Score (Oxford grade)	1.8 ± 0.7	0.6 ± 0.3	+1.2 (1.03- 1.37)	<0.001*
Meibum Quality (0–3 scale)	1.9 ± 0.8	0.8 ± 0.4	+1.1 (0.91 to 1.29)	<0.001*

Independent Samples t-test *Statistically significant ($p < 0.05$)

Correlation analysis reveals a strong negative relationship between severity of disease and tear film parameters ($r = -0.61$ for TBUT; $r = -0.58$ for Schirmer's test; both $p < 0.001$), which indicates that with increasing severity of seborrheic dermatitis, the tear film stability as well as tear secretion tends to decline significantly (Table 4).

Table 4: Correlation Between Seborrheic Dermatitis Severity and Ocular Parameters Among Cases (n=91)

Parameter	Pearson's Correlation Coefficient (r)	p-value
TBUT (seconds)	−0.61	<0.001*
Schirmer's Test (mm/5 min)	−0.58	<0.001*
Ocular Surface Staining	+0.63	<0.001*
Meibomian Gland Dysfunction Grade	+0.67	<0.001*

These overall findings highlight that facial seborrheic dermatitis is not only limited to a skin disorder but also has significant ocular involvement, affecting eyelid margins, tear film, and meibomian glands. Therefore, early detection along with timely treatment of ocular changes in such patients is important to prevent the development of chronic ocular irritation and possible long-term ocular surface-related complications.

DISCUSSION

In this study, it was found that patients suffering from facial seborrheic dermatitis (SD) show notable ocular involvement when compared to healthy individuals. The frequency of lid margin telangiectasia, conjunctival hyperemia, meibomian gland dysfunction, and tear film instability was observed to be higher in SD patients, which indicates a close association between cutaneous seborrheic inflammation and ocular surface pathology. Amitay-Laish *et al.* have reported that patients with seborrheic dermatitis had a significantly higher rate of meibomian gland loss and dysfunction, as assessed by meibography for objective confirmation [9]. The present study findings support their observation, as the majority of our SD cases demonstrated poor meibum quality along with shortened TBUT values. Similarly, a recent study conducted in Saudi Arabia by White *et al.* reported high prevalence of ocular surface changes, redness, and burning sensations in patients with seborrheic dermatitis, which emphasizes the requirement of ophthalmologic evaluation as a part of dermatological management [16]. On the local level, Awan *et al.* observed a strong association between seborrheic dermatitis and dry eye disease in the Pakistani population, where most of the affected patients had TBUT less than 8 seconds, which is quite comparable with our mean TBUT value of 6.2 seconds [18]. The decreased tear film stability and reduced Schirmer's scores in our study suggest that SD may affect both lipid and aqueous layers of the tear film, leading to mixed-type dry eye. This may be due to chronic inflammation of the lid margins and meibomian glands, as also described by Chen *et al.* who showed a possible role of Malassezia species in meibomian gland inflammation and ductal blockage [19]. In another report, Munie *et al.* found notable meibomian gland dropout and eyelid inflammation in patients with seborrheic blepharitis, showing that chronic microbial and inflammatory insult can significantly affect gland function [20]. Interestingly, we found a strong negative correlation between disease severity and ocular surface parameters such as TBUT and Schirmer's test. This correlation has not been well explored in earlier local literature, but Alofi *et al.* recently reported similar findings in a tertiary-care study, where ocular surface damage was more evident in patients with moderate to severe facial dermatitis [12]. Such correlation supports the hypothesis that the severity of skin inflammation directly influences ocular glandular function through local cytokine and microbial pathways. Local studies on dry eye prevalence in Pakistan have shown relatively lower rates in general populations (around 18–20%), as reported by Khan *et al.* and Irfan. [21, 22].

The markedly higher rate of ocular involvement among our SD patients, therefore, reflects a disease-specific risk factor rather than an environmental cause alone. Our data indicate that patients with facial seborrheic dermatitis

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should be considered at high risk for ocular surface disease even if they are asymptomatic. Clinically, these findings suggest that dermatologists should work in coordination with ophthalmologists for early detection of ocular involvement in SD cases. Regular lid hygiene, proper control of facial inflammation, and use of ocular lubricants can help to reduce patient discomfort and may prevent progression to chronic ocular surface damage. In cases with moderate to severe disease, the addition of anti-inflammatory therapy targeting both skin and eyelid may also be beneficial. Some limitations of this study should be considered. The study was hospital-based and cross-sectional in design; the temporal relationship could not be fully established. We also did not perform meibography or lipid layer interferometry in all participants, which might have provided more detailed information regarding gland morphology. However, the clinical findings observed in this study remain strong and are largely consistent with previously published studies, both at the regional and global levels.

CONCLUSIONS

Facial seborrheic dermatitis is significantly associated with ocular surface abnormalities. Facial seborrheic dermatitis is not only limited to a skin disorder but also has significant ocular involvement, affecting eyelid margins, tear film, and meibomian glands. Increasing disease severity correlates with worsening ocular parameters.

Authors' Contribution

Conceptualization: PJK
Methodology: VK, BK, AS, ND
Formal analysis: PJK, AS, VD, MN
Writing and Drafting: VK, BK
Review and Editing: PJK, VK, BK, AS, ND, VD, MN

All authors approved the final manuscript and take responsibility for the integrity of the work

Conflicts of Interest

All the authors declare no conflict of interest.

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