International Journal for Multidisciplinary Research (IJFMR)
E-ISSN: 2582-2160 ● Website: www.ijfmr.com ● Email: editor@ijfmr.com

The Silent Burden of Menopause: Understanding Dry Eye Syndrome in Women

Dr. Bhavya Singh Rana[1], Dr. Rajendra Singh Patel[2], Dr. Shubhangi Lohakare[3]

[1]Post Graduate Scholar, Shalakya Tantra
[2]Associate Professor, Shalakya Tantra
[3]Professor,Shalakya Tantra

Abstract:
Postmenopausal dry eye syndrome (DED) is a multifactorial ocular surface disorder that disproportionately affects women after menopause, primarily due to systemic hormonal changes such as the decline in estrogen and androgen levels. These hormonal shifts disrupt lacrimal and meibomian gland function, reducing tear secretion, lipid layer instability, and ocular surface inflammation. Clinically, the condition presents with ocular discomfort, tear film instability, and visual disturbances, which significantly impair quality of life and daily functioning. Given its complex etiology, postmenopausal DED requires a comprehensive understanding of epidemiology, pathophysiology, clinical features, diagnostic modalities, and management strategies. Modern ophthalmology emphasizes pharmacological and procedural interventions, while Ayurveda offers a holistic perspective through systemic balance, diet, and lifestyle modifications. This article reviews current evidence and explores integrative approaches, highlighting the importance of combining modern and traditional systems for effective prevention and treatment of postmenopausal dry eye syndrome.

Keywords: Dry Eye Disease, Post menopause, Hormonal Changes, Meibomian Gland Dysfunction, Tear Film Instability, Ayurveda.

Introduction:

Dry eye disease (DED) is a common ocular condition characterized by tear film instability, ocular discomfort, and visual disturbance. It is recognized as an ocular surface disease involving both aqueous-deficient and evaporative mechanisms. Postmenopausal women represent a particularly vulnerable group due to systemic hormonal changes. The decline in estrogen and androgen levels affects lacrimal gland function, meibomian gland physiology, and ocular surface homeostasis. Understanding the interplay between endocrinology and ocular surface pathology is crucial for ophthalmologists, especially at the postgraduate level.

Prevalence Rate:

The global prevalence of dry eye disease (DED) varies widely, ranging between 5% and 50% depending on the diagnostic criteria and population studied. Postmenopausal women are particularly affected, with studies reporting that up to 60% experience symptoms of DED. The prevalence of the condition increases

progressively with age, largely due to hormonal decline, which serves as a major contributing factor. Interestingly, Asian populations demonstrate a higher prevalence compared to Western populations, a difference that may be attributed to environmental exposures and genetic predispositions. Furthermore, hospital-based studies consistently reveal that postmenopausal women are approximately twice as likely to develop DED compared to men of similar age, underscoring the significant influence of hormonal changes on ocular surface health.

Signs and Symptoms:

Postmenopausal Dry Eye Syndrome presents with a constellation of symptoms and clinical signs that reflect both patient discomfort and ocular surface pathology. Common symptoms include burning, stinging and a persistent foreign body sensation, often accompanied by photophobia and ocular fatigue. Patients frequently report fluctuating vision, particularly during prolonged visual tasks such as reading or screen use, and dryness or discomfort that is exacerbated by environmental factors like wind, air conditioning, or extended exposure to digital devices. Clinically, the condition is characterized by reduced tear meniscus height and conjunctival hyperemia, with punctate epithelial erosions visible on corneal staining. Tear film instability is evident through a reduced breakup time, while meibomian gland dropout or inspissation further contributes to evaporative dry eye. In advanced cases, lid margin telangiectasia associated with meibomian gland dysfunction may also be observed, underscoring the multifactorial nature of the disease.

Etiology and Pathophysiology:

The pathophysiology of postmenopausal dry eye syndrome is multifactorial, with hormonal changes playing a central role. Estrogen and androgen receptors are widely distributed in the lacrimal and meibomian glands, and their decline after menopause leads to reduced tear secretion and instability of the lipid layer. Estrogen deficiency is associated with increased inflammatory cytokine activity, while androgen deficiency impairs lipid secretion, both of which contribute to ocular surface dysfunction. Meibomian gland dysfunction is particularly significant, as androgen deficiency alters lipid composition and secretion, resulting in increased tear evaporation and the development of evaporative dry eye, which is the predominant subtype in postmenopausal women. In addition, hormonal imbalance promotes ocular surface inflammation, with elevated cytokine release and matrix metalloproteinase activity causing epithelial damage. Tear hyperosmolarity further perpetuates this inflammatory cycle, worsening ocular surface disease. Neurological factors also contribute, as age-related changes in corneal sensitivity impair reflex tear secretion, while reduced blink rate during prolonged screen use exacerbates symptoms. Together, these mechanisms highlight the complex interplay of endocrine, inflammatory, and neurological factors underlying postmenopausal dry eye syndrome.

Diagnostic Approaches:

- **Schirmer's test:** Measures aqueous tear production.
- **Tear breakup time (TBUT):** Evaluates tear film stability.
- **Ocular Surface Disease Index (OSDI):** Standardized questionnaire for symptom severity.
- **Meibography:** Imaging of meibomian gland structure.
- **Tear osmolarity and MMP-9 assays:** Assess inflammatory markers.
- **Fluorescein and lissamine green staining:** Detect ocular surface damage.

Treatment:

Management of Postmenopausal Dry Eye Syndrome involves a combination of general measures, pharmacological interventions, and procedural approaches tailored to the severity of the condition. General measures focus on patient education and lifestyle modification, including the use of humidifiers, avoidance of air drafts and encouraging frequent blinking to maintain tear film stability. Nutritional support, particularly supplementation with omega-3 fatty acids, has been shown to improve tear film quality, while environmental control strategies such as reducing screen time and using protective eyewear outdoors help minimize exacerbating factors.

Pharmacological interventions remain the cornerstone of therapy. Artificial tears, especially preservative-free formulations, are considered first-line treatment to provide symptomatic relief. In cases with significant inflammation, topical anti-inflammatory agents such as cyclosporine A, lifitegrast, or short-term corticosteroids may be prescribed. Hormone replacement therapy (HRT) has been explored, though evidence regarding its efficacy remains mixed, while androgen therapy is still investigational but shows potential benefits in restoring meibomian gland function. Secretagogues like pilocarpine and cevimeline may also be used to stimulate tear production in selected patients.

Procedural interventions are reserved for moderate to severe or refractory cases. Punctal occlusion can enhance tear retention, while thermal pulsation therapy addresses meibomian gland dysfunction by improving lipid secretion. Intense pulsed light (IPL) therapy is an emerging modality that has shown promise in managing refractory evaporative dry eye. Additionally, scleral lenses provide mechanical protection and continuous hydration to the ocular surface, offering significant relief in advanced cases. Together, these strategies highlight the importance of a multimodal approach in effectively managing postmenopausal dry eye syndrome.

Correlation with Ayurveda:

In Ayurveda, ocular health is understood through the balance of the three fundamental doshas—Vata, Pitta, and Kapha. Postmenopausal Dry Eye Syndrome is primarily correlated with a disturbance in Vata dosha, which governs movement and dryness in the body. When Vata becomes aggravated, it leads to systemic dryness and degeneration, manifesting as ocular discomfort and tear film instability. The decline in Shukra dhatu (reproductive tissue) and Ojas (vital essence) after menopause further contributes to this imbalance, resulting in reduced nourishment and resilience of the ocular tissues.

Ayurvedic management emphasizes restoring balance and providing lubrication to the eyes and body. Netra Tarpana, a specialized therapy involving the application of medicated ghee around the eyes, is recommended to replenish moisture and strengthen ocular structures. Similarly, Triphala Ghrita, a ghee-based preparation infused with the rejuvenating properties of Triphala, is used for ocular nourishment and to reduce inflammation. Dietary measures play a crucial role, with emphasis on incorporating ghee, milk, and cooling foods to counteract dryness and pacify aggravated Vata. Lifestyle interventions such as stress reduction, yoga, and pranayama are also integral, as they help stabilize systemic Vata and promote overall well-being.

Thus, Ayurveda approaches postmenopausal dry eye syndrome holistically, integrating diet, lifestyle, and herbal formulations to restore systemic balance and enhance ocular health, complementing modern ophthalmological treatments.

Discussion:

Postmenopausal dry eye syndrome is a chronic, progressive condition that requires long-term management due to the complex interplay between systemic hormonal changes and ocular surface pathology. While modern ophthalmology provides effective pharmacological and procedural options such as artificial tears, anti-inflammatory agents, punctal occlusion, and advanced therapies, Ayurveda complements these by addressing systemic imbalances through holistic measures like Netra Tarpana, dietary modifications, and lifestyle practices such as yoga and pranayama. Integrating both perspectives may enhance patient outcomes by targeting both local ocular disease and overall systemic health. Looking ahead, future directions include the development of targeted hormonal therapies, personalized medicine approaches that combine hormonal status with ocular biomarkers, and rigorous clinical trials to validate Ayurvedic formulations, thereby expanding the therapeutic landscape for postmenopausal women suffering from dry eye disease.

Conclusion:

Postmenopausal Dry Eye Syndrome represents a major clinical concern in ophthalmology, arising from the combined effects of hormonal decline, inflammatory processes, and age-related changes in ocular physiology. Its impact on visual function and quality of life makes early recognition and individualized management strategies essential. Modern ophthalmology provides effective pharmacological and procedural interventions, while traditional systems such as Ayurveda emphasize restoring systemic balance through diet, lifestyle, and holistic therapies. Integrating these approaches can offer comprehensive care that addresses both local ocular pathology and overall systemic health. For postgraduate ophthalmology students, mastering the understanding of this systemic–ocular interplay is vital, as it not only enhances clinical decision-making but also prepares them to deliver patient-centered, multidisciplinary care in a condition that is both prevalent and complex.

References:

1. Kavya Lahari K, Chisti MA, Mohammed A, Satish AV. Assessment of Dry Eye Syndrome in Postmenopausal Women. Res J Med Sci. 2024;18(11):443–447. doi:10.36478/makrjms.2024.11.443.447 makhillpublications.co
2. Makayee AA, Aziz A, Salaam S. Assessment of Dry Eye Disease Progression in Postmenopausal Women: A Prospective Cohort Study. Int J Med Public Health. 2025;15(1):483–487. doi:10.70034/ijmedph.2025.1.90 Contemporary OB/GYN
3. Sharma R, Gupta N, Patel S. Prevalence of Dry Eye Disease in Postmenopausal Females in Central India. J Med Sci Clin Res. 2017;5(10):92–96. Available from: https://jmscr.igmpublication.org/v5-i10/92%20jmscr.pdf jmscr.igmpublication.org
4. Ebert M, Krewson C. Postmenopausal women show higher prevalence of dry eye disease. Contemporary OB/GYN. 2025 Oct 24. Available from: https://www.contemporaryobgyn.net/view/postmenopausal-women-show-higher-prevalence-of-dry-eye-disease Contemporary OB/GYN
5. Gupta PD. Hormonal Regulation of the Dry Eye. JSM Ophthalmology. 2020;7(1069):1–5. Available from: https://www.jscimedcentral.com/public/assets/articles/ophthalmology-7-1069.pdf JSciMed Central

6. Abelson MB, Lines L. Hormones in Dry-Eye: A Delicate Balance. Review of Ophthalmology. 2006 Feb 23. Available from: https://www.reviewofophthalmology.com/article/hormones-in-dry-eye-a-delicate-balance Review of Ophthalmology
7. Desai A. Hormonal Influences on Dry Eye Syndrome Explained. Synapse Forges. 2023. Available from: https://synapseforges.com/articles/hormonal-influences-on-dry-eye-syndrome synapseforges.com
8. Craig JP, Nichols KK, Akpek EK, Caffery B, Dua HS, Joo CK, et al. TFOS DEWS II Definition and Classification Report. Ocul Surf. 2017;15(3):276–283.
9. Stapleton F, Alves M, Bunya VY, Jalbert I, Lekhanont K, Malet F, et al. TFOS DEWS II Epidemiology Report. Ocul Surf. 2017;15(3):334–365.
10. Bron AJ, de Paiva CS, Chauhan SK, Bonini S, Gabison EE, Jain S, et al. TFOS DEWS II Pathophysiology Report. Ocul Surf. 2017;15(3):438–510.
11. Jones L, Downie LE, Korb D, et al. TFOS DEWS II Management and Therapy Report. Ocul Surf. 2017;15(3):575–628.
12. Schaumberg DA, Sullivan DA, Buring JE, Dana MR. Prevalence of dry eye syndrome among US women. Am J Ophthalmol. 2003;136(2):318–326.
13. Sullivan DA, Sullivan BD, Evans JE, et al. Androgen deficiency, meibomian gland dysfunction, and evaporative dry eye. Ann N Y Acad Sci. 2002;966:211–222.
14. Versura P, Giannaccare G, Vitiello L, et al. Hormonal replacement therapy and dry eye: a clinical study. Eur J Ophthalmol. 2007;17(5):695–701.