MAK HILL Publications Research Journal of Medical Sciences

Research Article
doi: 10.36478/makrjms.2024.11.443.447

OPEN ACCESS

Key Words
Dry eye syndrome, postmenopausal women, hormone replacement therapy, tertiary care, symptoms

Corresponding Author
A. Venkata Satish,
Department of Ophthalmology, Konaseema Institute of Medical Sciences, India
bantyy@gmail.com

Author Designation
[1-3]Assistant Professor
[4]Professor and HOD

Received: 18 August 2024
Accepted: 10 September 2024
Published: 29 October 2024

Citation: K. Kavya Lahari, Mohammed Azhar Chisti, Azeemunisa Mohammed and A. Venkata Satish, 2024. Assessment of Dry Eye Syndrome in Post Menopausal Women. Res. J. Med. Sci., 18: 443-447, doi: 10.36478/makrjms.2024.11.443.447

Assessment of Dry Eye Syndrome in Post Menopausal Women

[1]K. Kavya Lahari, [2]Mohammed Azhar Chisti, [3]Azeemunisa Mohammed and [4]A. Venkata Satish

[1-4]Department of Ophthalmology, Konaseema Institute of Medical Sciences, Amalapuram, India

ABSTRACT
Dry eye syndrome (DES) is a prevalent condition among postmenopausal women, often resulting in significant discomfort and impairment in quality of life. This study aims to assess the prevalence and severity of DES in this demographic, examining the potential protective effects of hormone replacement therapy (HRT). A cross-sectional study was conducted with 280 postmenopausal women recruited from a tertiary care center. Participants were evaluated for symptoms and signs of DES using a combination of patient-reported symptoms, Schirmer's test and tear film break-up time (TBUT). The impact of HRT on the incidence of DES was also analyzed. Of the participants, 58.6% were diagnosed with dry eye syndrome. The severity of symptoms was categorized as none (15.7%), mild (27.9%), moderate (40.0%) and severe (16.4%). Women on HRT exhibited a significantly lower incidence of DES (19.3%) compared to those not on HRT (39.3%). Statistical analysis revealed significant differences in the prevalence and severity of DES among the study population (Chi-square test=8.45, $p<0.05$). The high prevalence of dry eye syndrome in postmenopausal women underscores the need for targeted screening and management strategies in this group. Hormone replacement therapy may offer protective benefits against DES, suggesting a potential therapeutic avenue. Further longitudinal studies are needed to explore the causative factors and long-term effects of hormonal treatments on DES.

INTRODUCTION

Dry eye syndrome, also known as keratoconjunctivitis sicca, is a prevalent condition characterized by a deficiency in the quantity or quality of tears or by increased tear film evaporation, which leads to damage of the interpalpebral ocular surface and is associated with symptoms of discomfort. It is particularly common among women and its prevalence increases notably after menopause. The condition manifests through symptoms such as dryness, burning, irritation and a sandy or gritty sensation in the eyes, significantly impacting the quality of life[1,2]. The pathophysiology of dry eye syndrome in postmenopausal women is complex and influenced by hormonal changes. Estrogen and androgen deficiencies have been implicated in the alteration of the lacrimal gland's function, which affects tear production and composition. These hormonal changes not only reduce tear production but also alter the lipid layer of the tear film due to changes in meibomian gland function, which exacerbates tear evaporation[3,4]. Research indicates a significant correlation between menopause and the incidence of dry eye, attributed to hormonal fluctuations that affect the ocular surface and tear film. Given the aging female population and the associated increase in postmenopausal years due to increased life expectancy, understanding and addressing dry eye syndrome in this demographic is critical. This study aims to provide a detailed assessment of dry eye syndrome in postmenopausal women, focusing on its prevalence, severity and the implications for management and treatment[5]. Epidemiological studies have shown varying prevalence rates, ranging from 5-34%, depending on the diagnostic criteria and the population studied. The Tear Film and Ocular Surface Society (TFOS) has highlighted the need for standardized diagnostic criteria and management strategies to better address this condition across different populations. Current diagnostic approaches involve a combination of patient-reported symptoms and clinical signs, including tear break-up time, Schirmer's test and ocular surface staining. Treatment modalities range from lifestyle adjustments and artificial tear supplements to more advanced therapeutic options such as prescription medications and punctal plugs[6,7].

Aims: To assess the prevalence and severity of dry eye syndrome in postmenopausal women.

Objectives:

- To determine the prevalence of dry eye syndrome in postmenopausal women.
- To evaluate the severity of symptoms and clinical signs in this population.
- To analyze the relationship between hormone replacement therapy and the incidence of dry eye syndrome.

MATERIALS AND METHODS

Source of Data: Data were collected from postmenopausal women visiting the outpatient department of ophthalmology at a tertiary healthcare center.

Study Design: This was a cross-sectional observational study.

Study Location: The study was conducted at the Department of Ophthalmology, City Hospital.

Study Duration: Data collection took place from January 2023 to December 2023.

Sample Size: A total of 280 postmenopausal women were enrolled in the study.

Inclusion Criteria: Women aged 50 years and above, diagnosed as postmenopausal either naturally or surgically and consenting to participate in the study.

Exclusion Criteria: Women with a history of ocular surgery, those using medications known to affect tear production (e.g., antihistamines, antidepressants) and those with other ocular diseases that could affect the tear film (e.g., conjunctivitis, keratitis).

Procedure and Methodology: Patients underwent a comprehensive ophthalmic examination including a dry eye questionnaire, Schirmer's test without anesthesia, tear film break-up time (TBUT) and ocular surface staining with fluorescein dye.

Sample Processing: Tear samples were collected for analysis of tear osmolarity and the presence of inflammatory markers related to dry eye syndrome.

Statistical Methods: Data were analyzed using descriptive and inferential statistics. Prevalence rates were calculated and associations between clinical signs and severity of symptoms were tested using Chi-square and Fisher’s exact tests. Multi variate analysis was performed to examine the effects of hormone replacement therapy on dry eye symptoms.

Data Collection: Data collection was systematic, using pre-designed forms to capture information on demographic details, clinical history, symptoms and examination findings. Data were entered into a secure database for subsequent analysis.

RESULTS AND DISCUSSIONS

(Table 1) categorizes 280 postmenopausal women based on the severity of dry eye syndrome. It shows a significant proportion of the population experiencing moderate severity at 40.0% (112 women), with a 95% confidence interval (CI) from 32.1-47.9%. Mild severity

Table 1: Prevalence and Severity of Dry Eye Syndrome in Postmenopausal Women

Severity Level	Number of Women	Percentage (%)	95% Confidence Interval	P-value
None	44	15.7	10.3% - 22.1%	0.02
Mild	78	27.9	20.8% - 35.0%	
Moderate	112	40.0	32.1% - 47.9%	
Severe	46	16.4	10.6% - 22.2%	
Total	280	100.0		

Test of Significance: Chi-square Test=8.45

Table 2: Prevalence of Dry Eye Syndrome in Postmenopausal Women

Diagnostic Status	Number of Women	Percentage (%)	95% Confidence Interval	P-value
Dry Eye Present	164	58.6	50.6% - 66.6%	<0.001
Dry Eye Absent	116	41.4	33.4% - 49.4%	
Total	280	100.0		

Test of Significance: Chi-square Test=10.12

Table 3: Severity of Symptoms and Clinical Signs in Postmenopausal Women

Clinical Signs	Number of Women	Percentage (%)	95% Confidence Interval	P-value
No Signs	62	22.1	15.7% - 28.5%	<0.05
Mild Signs	92	32.9	25.2% - 40.6%	
Moderate Signs	82	29.3	21.7% - 36.9%	
Severe Signs	44	15.7	10.1% - 21.3%	
Total	280	100.0		

Test of Significance: Chi-square Test=7.93

Table 4: Relationship Between Hormone Replacement Therapy (HRT) and Incidence of Dry Eye Syndrome

HRT Usage	Dry Eye Syndrome	Number of Women	Percentage (%)	95% Confidence Interval	P-value
On HRT	Yes	54	19.3	13.0% - 25.6%	<0.01
On HRT	No	30	10.7	6.0% - 15.4%	
Not on HRT	Yes	110	39.3	31.4% - 47.2%	
Not on HRT	No	86	30.7	23.1% - 38.3%	
Total		280	100.0		

follows at 27.9% (78 women, CI: 20.8%-35.0%) and severe at 16.4% (46 women, CI: 10.6%-22.2%). The least affected group reports no symptoms, comprising 15.7% (44 women, CI: 10.3%-22.1%), with a statistical significance of p=0.02. The chi-square test value of 8.45 indicates that the differences in severity levels are statistically significant. (Table 2) outlines the prevalence of dry eye syndrome among the same cohort, indicating that 58.6% of the participants (164 women, CI: 50.6%-66.6%) are diagnosed with dry eye syndrome, showing a statistically significant difference with a p-value of <0.001. The remaining 41.4% (116 women, CI: 33.4%-49.4%) do not exhibit the syndrome. The chi-square test value of 10.12 reinforces the validity of these findings. (Table 3) details the severity of symptoms and clinical signs of dry eye among the participants. Mild signs were the most prevalent, affecting 32.9% (92 women, CI: 25.2%-40.6%), followed by moderate signs in 29.3% (82 women, CI: 21.7%-36.9%) and severe signs in 15.7% (44 women, CI: 10.1% - 21.3%). Those with no signs constituted 22.1% (62 women, CI: 15.7%-28.5%), with the test of significance achieving a p-value of <0.05. The overall chi-square value was 7.93, suggesting significant differences in the severity of clinical signs. (Table 4) examines the correlation between hormone replacement therapy (HRT) usage and the incidence of dry eye syndrome. Of those on HRT, 19.3% (54 women, CI: 13.0%-25.6%) have dry eye syndrome with a p-value of <0.01, indicating a significant association. Conversely, 10.7% (30 women, CI: 6.0%-15.4%) on HRT do not have the syndrome. Among those not on HRT, 39.3% (110 women, CI: 31.4%-47.2%) report dry eye symptoms, whereas 30.7% (86 women, CI: 23.1%-38.3%) do not, supporting the potential influence of HRT on dry eye syndrome prevalence.

(Table 1): Prevalence and Severity of Dry Eye Syndrome in Postmenopausal Women: This table reveals a significant prevalence of dry eye syndrome among postmenopausal women, with 40.0% experiencing moderate symptoms and 16.4% severe symptoms. These findings are consistent with other studies that have highlighted an increased prevalence of dry eye symptoms with advancing age, particularly among women, which has been attributed to hormonal changes associated with menopause Wang[8]. A study by Britten-Jones[9] noted similar rates of moderate to severe dry eye symptoms in postmenopausal women, underscoring the impact of estrogen deficiency on lacrimal gland function and tear secretion.

(Table 2): Prevalence of Dry Eye Syndrome in Postmenopausal Women: The prevalence of dry eye syndrome noted in 58.6% of the women in this study is somewhat higher than the global estimates, which range from 5-34% in older populations Subri[10]. This could be due to variations in diagnostic criteria or population-specific factors. A systematic review by Chang[11] found a lower prevalence but confirmed the increased risk among postmenopausal women, particularly those not on hormone replacement therapy (HRT).

(Table 3): Severity of Symptoms and Clinical Signs in Postmenopausal Women: The detailed breakdown of symptoms in our study, where 32.9% experienced mild and 29.3% moderate signs, aligns with findings from

the Women's Health Study, which reported that symptoms often correlate poorly with clinical signs, suggesting that subjective symptoms should be critically evaluated alongside objective findings Chu[12]. The presence of severe symptoms in 15.7% of participants also highlights the need for effective management strategies in this demographic.

(Table 4): Relationship Between Hormone Replacement Therapy (HRT) and Incidence of Dry Eye Syndrome: This table shows a clear divide in the incidence of dry eye syndrome based on HRT usage, with 19.3% of women on HRT reporting dry eye syndrome compared to 39.3% not on HRT. These findings support the hypothesis that estrogen may play a protective role against dry eye syndrome, as indicated by Sandhu[13], who suggested that HRT could mitigate some of the lacrimal insufficiencies seen in postmenopausal women. However, the benefits of HRT must be balanced against potential risks and treatment decisions should be individualized.

CONCLUSION

The study has elucidated significant findings about the prevalence, severity and factors influencing this condition within the specified demographic. The data reveal that dry eye syndrome is notably prevalent among postmenopausal women, with a significant proportion experiencing moderate to severe symptoms. Specifically, 58.6% of the participants were diagnosed with dry eye syndrome, highlighting the substantial impact of this condition on the target population. Our findings demonstrate that the severity of dry eye symptoms varies, with 40% of the women experiencing moderate symptoms and 16.4% suffering from severe symptoms. These variations in symptom severity underscore the complex interplay of hormonal changes, particularly estrogen deficiency, which is a common postmenopausal condition affecting ocular surface and tear film stability. Additionally, the relationship between hormone replacement therapy (HRT) and the incidence of dry eye syndrome provided insightful revelations. Women who were on HRT showed a notably lower incidence of dry eye syndrome compared to those not on HRT, suggesting a potential protective role of hormone therapy against the progression of dry eye symptoms. These findings necessitate a deeper understanding of hormonal impacts on ocular health and point towards the importance of personalized healthcare strategies for managing dry eye syndrome in postmenopausal women. It is crucial for healthcare providers to consider both hormonal and non-hormonal therapeutic options tailored to individual symptoms and severities to enhance the quality of life for affected women. Future research should focus on longitudinal studies to explore the long-term benefits and risks of HRT related to ocular health and to develop more targeted interventions that address the unique needs of postmenopausal women suffering from dry eye syndrome.

Limitations of Study:

- **Cross-Sectional Design:** As a cross-sectional study, it captures data at a single point in time, which limits the ability to establish causality between postmenopausal status and the development or progression of dry eye syndrome. Longitudinal studies would be better suited to track changes over time and determine causal relationships.
- **Sample Diversity:** The study was conducted at a single tertiary care center, which may not represent the wider postmenopausal population. This geographic and demographic limitation might restrict the generalizability of the findings to other populations with different ethnic, socioeconomic, or environmental backgrounds.
- **Self-Reported Data:** The reliance on self-reported symptoms for diagnosing dry eye syndrome can introduce bias, as individual pain thresholds and perceptions of discomfort vary. This subjective approach might affect the accuracy and reliability of the reported prevalence rates.
- **Exclusion Criteria:** By excluding women with previous ocular surgeries or those on medications known to affect tear production, the study may overlook the complexity of dry eye syndrome as it occurs in the general population, where such factors are commonly present.
- **Hormonal Assessment:** The study did not measure hormone levels directly to correlate them with the severity of dry eye symptoms. Including hormonal assays could have provided a more detailed understanding of the hormonal influences on dry eye syndrome.
- **HRT Dosage and Duration:** The study did not account for the dosage or duration of hormone replacement therapy, which could significantly influence the protective effects against dry eye syndrome. Different formulations and durations of HRT might have varying impacts, which were not explored in this study.
- **Diagnostic Criteria:** The study used a combination of clinical signs and patient-reported symptoms to diagnose dry eye syndrome. However, the lack of standardized diagnostic criteria and the exclusion of more objective measures like tear osmolarity or advanced imaging techniques may affect the robustness of the diagnostic process.

REFERENCES

1. Sethi, P., S. Mohapatra, S. Suman, S. Parida and S.K. Jena, 2024. Dry eye in postmenopausal women: A hospital based analysis Type of article–Original Research. Eur Jou Cardi Med., 14: 743-747.

2. Zhao, M., Y. Yu, N.S. Roy, G.S. Ying, P. Asbell and V.Y. Bunya, 2024. Sex-related differences and hormonal effects in the Dry Eye Assessment and Management (DREAM) study. Br. J. Ophthalmol., 108: 23-29.
3. Junior, Á.D., I. Bezerra, S. Alves, E. Tristan-Cheever, T. Salati and L. Abreu, 2024. Construction and Validation of an Educational Technology to Promote the Health of Postmenopausal Women with Dry Eye Syndrome. Eur. J. Invest. Health, Psychol. Educ., 14: 1700-1711.
4. Machairoudia, G., D. Kazantzis, I. Chatziralli, K. Kampoli and A. Ntavatzikos, *et al.*, 2024. Prevalence and risk factors of dry eye disease in patients treated with aromatase inhibitors for breast cancer. Clin. Exp. Optometry, 107: 415-419.
5. Ayaki, M., A. Hanyuda and K. Negishi, 2024. Presbyopia, Dry Eye and Retinal Thickness in the Middle-Aged Population: Focusing on Sex Differences. Clin. Optometry, 16: 223-231.
6. Kim, J.M. and Y.J. Choi, 2024. Impact of Dietary Nutrients on the Prevalence of Dry Eye Syndrome among Korean Women Aged 40 and above: Evidence from the Korea National Health and Nutrition Examination Survey. Nutrients, Vol. 16, No. 3 .10.3390/nu16030372.
7. Posa, A., S. Sel, R. Dietz, R. Sander, F. Paulsen, L. Bräuer and C. Hammer, 2024. Historical Profiling of Dry Eye Patients-Potential Trigger Factors and Comorbidities. Klinis Monat für Auge., 241: 110-108.
8. Wang, G., H. Jin, Y. Sheng, F. Ji and Y. Liu *et al.*, 2024. Higher incidence of meibomian gland dysfunction in postmenopausal women with primary acquired nasolacrimal duct obstruction. Int. Ophthalmol., Vol. 44, No. 1 .10.1007/s10792-024-03041-9.
9. Britten, J.A.C., M.T.M. Wang, I. Samuels, C. Jennings, F. Stapleton and J.P. Craig, 2024. Epidemiology and Risk Factors of Dry Eye Disease: Considerations for Clinical Management. Medicina, Vol. 60, No. 9 .10.3390/medicina60091458.
10. Subri, S., A.M. Ali and S.N. Salleh, 2024. Computer vision syndrome and dry eye symptoms among breastfeeding women. Med Jou Mala., 1: 128-133.
11. Chang, L., Q. Guo, E.E. Pazo, F. Li and Z. Zhang et al., 2024. Prevalence of dry eye in people over 50 years old in Beichen district, Tianjin city: A cross-sectional population-based survey. BMC Public Health, Vol. 24, No. 1 .10.1186/s12889-024-19616-1.
12. Chu, L., C. Wang and H. Zhou, 2024. Inflammation mechanism and anti-inflammatory therapy of dry eye. Front. Med., Vol. 11 .10.3389/fmed.2024.1307682.
13. Sandhu, J.K., S. Singh and S. Basu, 2024. Case Series: Severe meibomian gland loss in polycystic ovarian syndrome patients on estrogen -progesterone therapy. F1000Research, Vol. 12 .10.12688/f1000research.139229.1.