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To evaluate the spectrum of dry eye disease and effect on central corneal thickness in post-menopausal females

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Abstract

Background: Dry eye disease (DED) is a prevalent ocular condition characterized by disruption in the tear film, leading to symptoms such as ocular discomfort, visual disturbances, and potentially damaging the ocular surface. It affects individuals across various demographics, with post-menopausal females being particularly susceptible due to hormonal changes associated with menopause.

Aim: This study is aimed to evaluate the spectrum of Dry Eye Disease (DED) and effect on central corneal thickness in post-menopausal females.

Methods: A prospective observational study conducted from February 2023 to March 2024 at Netaji Subhash Chandra Bose Subharti Medical College, Meerut. Ninety post-menopausal female patients were divided into three groups. Group A (females aged 45 to 50 years), Group B (females aged >50 to 55 years), Group C (females aged > 55 years). Schirmer's test, Tear film breakup time (TBUT), Ocular Surface Disease Index (OSDI) score, central corneal thickness (CCT) and levels of serum FSH, LH and Estrogen was recorded at day⁻¹.

Results: The patients are taken on an OPD basis and findings on day 1 were noted and observations were recorded. Schirmer's scores are found to decrease in patients as their age increased i.e. in group C the value is less than in group B and group A. TBUT score also decreased with age but they are not statistically significant. In the case of the OSDI score, it shows an increase in its value indicating increasing severity of dry eye with age, 45-50 year age groups show a mean of 29.97 OSDI score, 50-55 year age groups show a mean of 53.63 OSDI score, and >55 year age groups show a mean of 65.2 OSDI score. The central corneal thickness (CCT) tends to decrease with increasing age, the correlation between increasing age and a decrease in central corneal thickness has been positive, in both eyes but there was no significant correlation seen between CCT and reduction in hormones with increasing age after menopause.

Conclusion: In conclusion, the study highlights the significant impact of menopause on dry eye syndrome and provides initial insights into the potential correlation with central corneal thickness. The findings underscore the importance of personalized approaches to managing ocular health in menopausal women, integrating hormonal considerations with clinical assessment and treatment strategies. procedure in reducing the intraocular pressure.

Keywords: Dry eye, central corneal thickness, female, post-menopausal

Introduction

Dry eye' is usually thought of as a marked reduction in the quantity and quality of tears: the eyes feel a foreign body sensation (sand in the eye) and there is increased irritation from wind, smoke, and heat, difficulty in wearing contact lenses, stinging and burning^[1].

Many factors linked to dry eye disease include hormonal alterations, psychological indices, medications^[2], aging, reproductive factors, tobacco, contact lens use, ocular surgery, and dry environment^[3, 4]. Dry eye syndrome has multiple comorbidities. It affects 5-34% of the population worldwide and its prevalence increases with age^[5, 6] The risk of dry eye disease in both genders increases with age, when tear production normally decreases, but has a higher incidence among females, with varying ratios, than in men^[7].

Dry eye disease (DED) is a prevalent ocular condition characterized by disruption in the tear film, leading to symptoms such as ocular discomfort, visual disturbances, and potentially damaging the ocular surface. It affects individuals across various demographics, with post-menopausal females being particularly susceptible due to hormonal changes associated with menopause.

Post-menopausal women with co-morbidities are at a greater risk for developing dry eye syndrome and the subsequent negative effects on their eye health [8] despite the great prevalence of dry eye in women aged fifty and over [9], and the possible influence of dry eye in reduced corneal thickness values [10], we have not found any specific studies that address corneal thickness values in postmenopausal women with dry eye. The post-menopausal period is marked by a decline in estrogen levels, which can significantly influence ocular surface health. Estrogen receptors are present in the lacrimal gland and ocular surface tissues, suggesting a potential role of estrogen in maintaining tear film stability and ocular surface integrity. As estrogen levels decline during menopause, alterations in tear film composition and production may occur, predisposing post-menopausal females to DED.

With the following background, this study has been conducted to evaluate the spectrum of dry eye disease and its effect on corneal thickness in post-menopausal females.

Aims and Objectives

Aim

To evaluate the spectrum of Dry Eye Disease (DED) and effect on central corneal thickness in post-menopausal females

Objectives

- To evaluate the spectrum of dry eye disease in the post-menopausal female population.
- To analyze the severity of dry eye disease with the duration of menopause.
- To study the effect of dry eye and its correlation with corneal thickness in post menopausal women.

Materials and Methods

A prospective observational (randomized) study has been conducted to evaluate the spectrum of dry eye disease and its effect on corneal thickness in post-menopausal females at the Department of Ophthalmology, Netaji Subhash Chandra Bose Subharti Medical College, Meerut.

A sample size of 90 cases was taken. Patients in the study have been divided into three groups.

Group A: females aged 45 to 50 years

Group B: females aged >50 to 55 years

Group C: females aged > 55 years

Inclusion criteria included Post-menopausal females of age >45 and above who visited eye OPD with dry eye symptoms irrespective of their previous treatment status like grittiness/itching/watching. Females of >45 years with amenorrhoea of more than 6 months, while exclusion criteria involved any history of ocular trauma/surgeries, history of keratitis or lid disorders, Contact lens wearers, Facial nerve palsy, Trigeminal neuralgia, Average screen time of more than equal to 6 hours/day for a minimum duration of 1 year, Pregnant females (screened by UPT and sonogram), Any history of Cancer/chemotherapy/radiation, Systemic diseases (Sjogren’s syndrome, rheumatoid arthritis, diabetes mellitus, thyroid eye disease, systemic lupus erythematosus), History of chronic usage of any topical eye medication.

Results

Schirmer’s value

Table 1: Value of Schirmer’s score in both the eyes in all three age groups

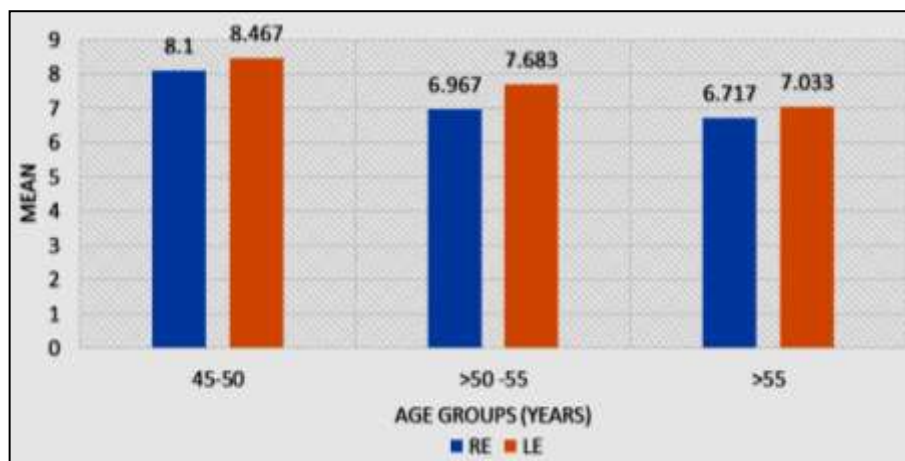
		Mean	Std. Deviation	Minimum	Maximum	P value
RE	45-50	8.100	2.3171	4.0	12.0	0.03 (S)
	>50-55	6.967	2.0297	4.0	12.0	
	>55	6.717	2.0497	2.0	10.0	
LE	45-50	8.467	2.5255	4.0	15.0	0.03 (S)
	>50-55	7.683	1.5452	5.0	12.0	
	>55	7.033	2.2164	2.0	11.0	

In the right eye, 45-50 year age groups show a mean of 8.1 Schirmer’s value, >50-55 year age groups show a mean of 6.96 Schirmer’s value, and >55 year age groups show a mean of 6.71 Schirmer’s value.

Schirmer’s values show a significant decline with an increase in age.

In the left eye, the 45-50 year age group showed a mean of 8.46 Schirmer’s value, the 50-55 year age group showed a mean of 7.68 Schirmer’s value, and the >55 year age group showed a mean of 7.03 Schirmers value.

Schirmer’s values show a significant decline with an increase in age



Bar graph showing value of Schirmer’s score in both the left and right eyes in all three age groups

Tearfilm Breakup Time

Table 2: Value of TBUT score in both the eyes in all three age groups

	Mean	Std. Deviation	Minimum	Maximum	P value
RE	45-50	8.133	4.0	14.0	0.04 (S)
	>50-55	6.933	4.0	10.0	
	>55	7.033	3.0	11.0	
LE	45-50	8.100	5.0	12.0	0.09
	>50-55	7.733	5.0	11.0	
	>55	7.067	4.0	10.0	

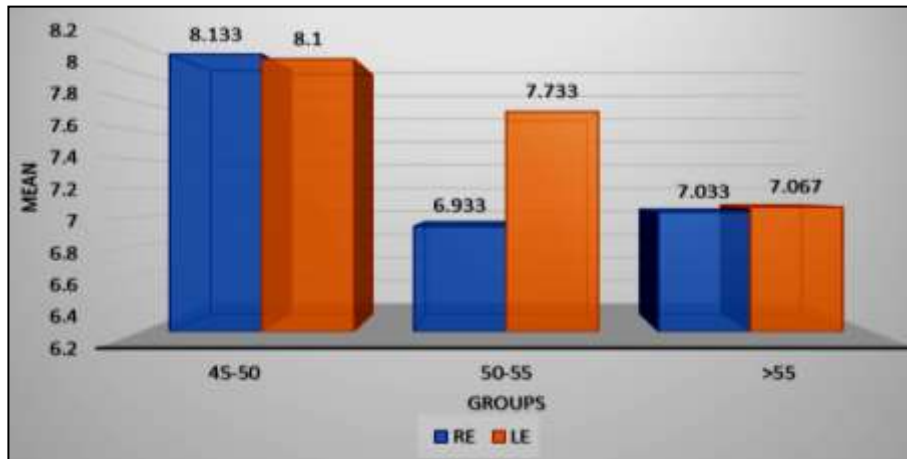
In the right eye, the 45-50-year-old age group shows a mean

of 8.13 TBUT value, the 50-55-year-old age group shows a mean of 6.93 TBUT value, and the > 55-year-old age group shows a mean of 7.03 TBUT value.

TBUT values show a significant decline with increased age in RE

In the left eye, the 45-50 year age group shows a mean of 8.1 TBUT value, the 50-55 year age group shows a mean of 7.73 TBUT value, and the >55 year age group shows a mean of 7.06 TBUT value.

TBUT values show a non-significant result with increased age LE



Bar graph showing the value of TBUT score in both the left and right eyes in all three age groups.

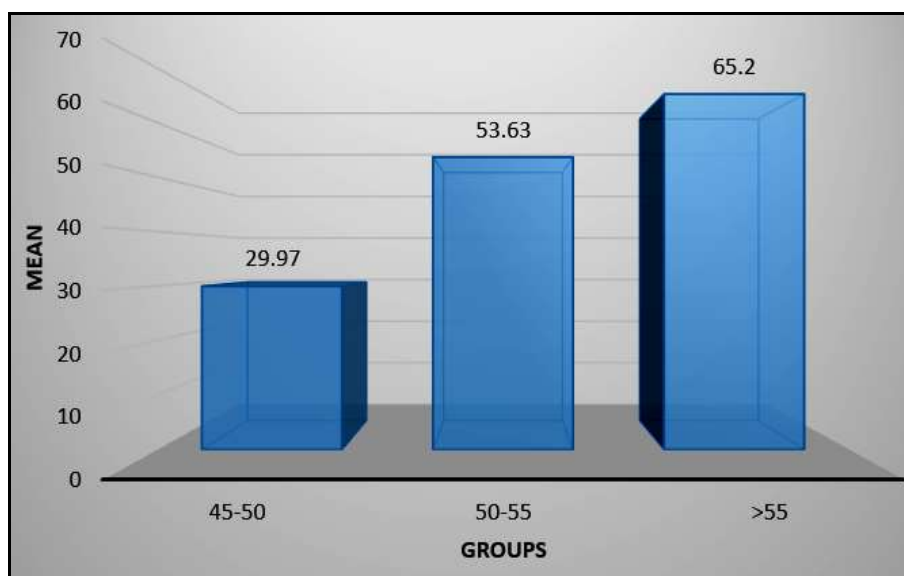
Ocular Surface Disease Index

Table 3: OSDI values in all three age groups

	Mean	Std. Deviation	Minimum	Maximum	P value
45-50	29.97	9.445	12	50	0.001 (S)
>50-55	53.63	19.301	12	82	
>55	65.20	15.278	34	92	

45-50 year age groups show mean 29.97 OSDI score, 50-55 year age groups show mean 53.63 OSDI score and >55 year age groups show mean 65.2 OSDI score.

OSDI values showed significant increase with increase in age.



Bar graph showing OSDI values in all three age groups.

Central corneal thickness

Table 4: Value of CCT in both the eyes in all three age groups

	Mean	Std. Deviation	Minimum	Maximum	P value
45-50	570.63	49.143	494	678	0.001 (S)
RE >50-55	536.03	32.006	456	598	
>55	512.10	27.517	469	578	0.001 (S)
LE 45-50	571.63	50.380	495	680	
>50-55	536.67	30.508	465	594	0.001 (S)
>55	511.90	28.232	445	562	

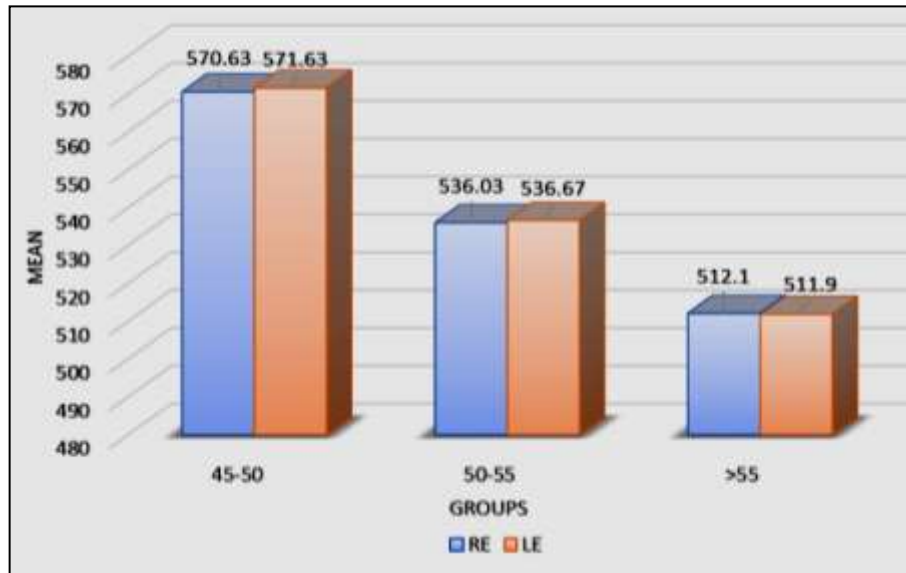
In the right eye, the 45-50 year age groups show a mean of 570.63, CCT value, >50-55 year age groups show a mean of

536.03 CCT value and >55 year age groups show a mean of 512.10 CCT value.

CCT values show a significant decline with an increase in age.

In the left eye, the 45-50 year age groups show a mean of 571.63, CCT value, >50-55 year age groups show a mean of 536.67 CCT value and >55 year age groups show a mean of 511.90 CCT value.

CCT values show a significant decline with an increase in age.

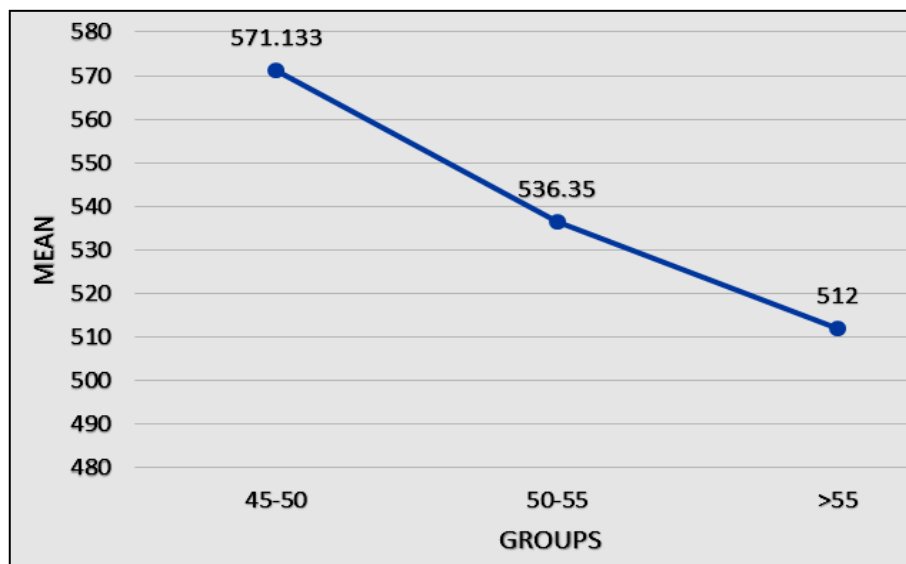


Bar graph showing CCT value in both the left and right eyes in all three age groups and significant decline with age

Table 5: Mean Value of CCT of both the eyes in all three age groups

	Mean	Std. Deviation	Minimum	Maximum	P value
45-50	571.133	49.4898	494.5	679.0	0.001 (S)
>50-55	536.350	30.9956	460.5	596.0	
>55	512.000	27.2944	461.5	567.0	

The mean value of CCT of both right and left eyes show statistically significant results line graph showing a declining trend in CCT value with increasing age



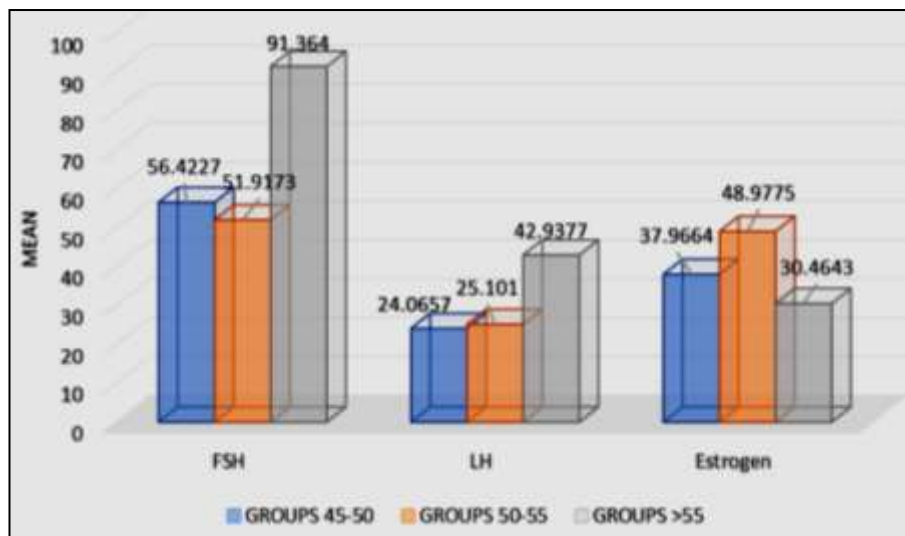
Thus it can be stated that CCT declines with age

Hormonal Tests

Table 6: Comparison of mean values of FSH, LH and ESTROGEN between the groups.

		Mean	Std. Deviation	Minimum	Maximum	P value
FSH	45-50	56.4227	33.15294	2.85	131.92	0.001 (S)
	>50-55	51.9173	22.16089	6.70	87.97	
	>55	91.3640	21.99533	43.12	127.89	
LH	45-50	24.0657	14.47843	1.12	64.63	0.001 (S)
	>50-55	25.1010	13.54719	5.88	67.78	
	>55	42.9377	22.98752	9.52	89.45	
Estrogen	45-50	37.9664	19.82191	.41	109.04	0.001 (S)
	>50-55	48.9775	22.37132	.50	98.68	
	>55	30.4643	15.03062	.62	67.23	

In the hormonal tests, FSH and LH increase with age and estrogen shows a decline with age all results are statistically significant



Bar Graph showing comparison of FSH, LH and ESTROGEN between the three groups

Group A (45-50)

Table 7: Shows the correlation between CCT and the Hormonal tests in group A

Group A

		FSH	LH	Estrogen
CCT	Pearson Correlation	-.015	-.034	-.046
	Sig. (2-tailed)	.937	.860	.811
	N	30	30	30

CCT did not show any correlation with hormone levels in group A.

Group B (>50-55)

Table 8: Shows the correlation between CCT and the Hormonal tests in group B

		FSH	LH	Estrogen
CCT	Pearson Correlation	-.109	-.129	-.301
	Sig. (2-tailed)	.566	.497	.107
	N	30	30	30

CCT did not show any correlation with hormone levels in group B.

Group C (>55)

Table 9: Shows the correlation between CCT and the Hormonal tests in group C

		FSH	LH	Estrogen
CCT	Pearson Correlation	-.061	-.018	.110
	Sig. (2-tailed)	.750	.923	.562
	N	30	30	30

CCT did not show any correlation with hormone levels in group C.

Thus in conclusion we can say that the effect of hormones on central corneal thickness is non-significant.

Discussion

The patients were taken on OPD basis and findings on day⁻¹

were noted and observations were recorded

- Schirmer’s scores were found to be significantly decreased in patients as their age increased i.e. in group C the value was less than group B and group A. These findings were found to be statistically significant with a p value=0.03
- The findings in TBUT score also decreased with age

but they were not statistically significant.

- In the case of the OSDI score, it showed an increase in its value indicating increasing severity of dry eye with age.
- 45-50 year age groups show a mean of 29.97 OSDI score, 50-55 year age groups show the mean of 53.63 OSDI score, and >55 year age groups show a mean of 65.2 OSDI score. OSDI values showed a significant increase with the increase in age.
- The above findings state that the spectrum of dry eye disease in post-menopausal female population worsens with age and also the severity of dry eye disease increases with the duration of menopause.
- In our study the central corneal thickness (CCT) tends to decrease with increasing age, although the extent of this decrease and its clinical implications can vary among individuals.
- In our study, the correlation between increasing age and a decrease in central corneal thickness has been positive, in both eyes.
- There was no significant correlation seen between CCT and reduction in hormones with increasing age after menopause

Conclusion

In conclusion, this study has elucidated the significant relationship between dry eye disease and central corneal thickness in post-menopausal females. The findings demonstrate that hormonal changes associated with menopause contribute to the prevalence and severity of dry eye symptoms, which in turn affect the structural integrity of the cornea. By evaluating the spectrum of dry eye disease in this demographic, the study highlights the need for targeted screening and management strategies. These interventions could enhance the quality of life for affected individuals and potentially mitigate long-term ocular complications. Future research should focus on longitudinal studies to further explore the underlying mechanisms and therapeutic approaches for managing dry eye disease in post-menopausal women.

Conflict of Interest

Not available

Financial Support

Not available

References

1. Versura P, Campos EC, *et al.* Menopause and dry eye, a possible relationship. *Gynaecological Endocrinology*. 2005 May;20(5):289-298.
2. American Academy of Ophthalmology. Dry eye syndrome - 2013. Available from: <https://www.aao.org>.
3. Dartt DA. Neural regulation of lacrimal gland secretory processes: Relevance in dry eye diseases. *Prog Retin Eye Res*. 2009;28(2):155-177.
4. Liu H, Begley C, Chen M, Bradley A, *et al.* A link between tear instability and hyperosmolarity in dry eye. *Invest Ophthalmol Vis Sci*. 2009;50(8):3671-3679.
5. Villatoro AJ, Fernandez V, Claros S, *et al.* Regenerative therapies in dry eye disease: From growth factors to cell therapy. *Int J Mol Sci*. 2017;18(1):58.
6. Chia EM, Mitchell P, Rochtchina E, *et al.* Prevalence and associations of dry eye syndrome in an older

population: the Blue Mountains Eye Study. *Clin Exp Ophthalmol*. 2003;31(3):229-232.

7. Dartt DA. Neural regulation of lacrimal gland secretory processes: Relevance in dry eye diseases. *Prog Retin Eye Res*. 2009;28(2):155-177.
8. Takahashi TA, Johnson KM. Menopause. *Am Fam Physician*. 2015 May;99(3):521-534.
9. Ziemanski JF, Wolters LR, Jones-Jordan L, *et al.* Relation between dietary essential fatty acid intake and dry eye disease and meibomian gland dysfunction in postmenopausal women. *Am J Ophthalmol*. 2018;189:29-40.
10. Schaumberg DA, Sullivan DA, Buring JE, *et al.* Prevalence of dry eye syndrome among US women. *Am J Ophthalmol*. 2003;136(2):318-326.

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