

Association Of Central Corneal Thickness With Myopia Vs Emmetropia In Patients Visiting Ophthalmology Dept. Of A Tertiary Care Hospital Of Islamabad

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¹ Conception of study
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Abstract

Objective: The aim of the study was to determine the difference between central corneal thickness (CCT) among myopic and emmetropic eyes.

Material and Methods A total of 186 participants participated in this comparative cross-sectional study. The sample size was calculated using the WHO calculator and enrolled by consecutive sampling technique. Detail eye examinations were performed of anterior and posterior segments with slit-lamp and refractive status was determined with Auto-refractometer (Nidek ARK 1a) and Pachymetry with Specular Microscope (Topcon SP2000P). The analysis of data was performed in SPSS 22.

Results To carry out the study, 186 candidates volunteered their time and effort. Male and female participants were included in the study. About 56% of the candidates were men, and 44% were women. Individuals' ages varied from 16 to 49, on average (16-49). As for the control group, the average central corneal thickness was 522.30 microns and a standard deviation of ± 29.563 . Their sizes varied from 439 microns to 619 microns. The average CCT of myopic people was 515.18 microns, and the standard deviation was ± 28.972 microns. The relationship between CCT in myopic eyes and CCT in emmetropic eyes was analysed using a paired t-test. The P value was only 0.09, the relevance of the test was not significant.

Conclusion: CCT difference between myopic and emmetropic eyes was not statistically significant (P 0.09).

Keywords: Myopes, Emmetropes, CCT

Introduction

Refractive error is the most prevalent ocular ailment presented to eye departments. It's a disorder of the eyes in which light rays from infinity focus just in front of the retina causing blurred vision and other additional adverse effects if left untreated. Consequently, its significance in ophthalmology is multifaceted.¹ All other causes of vision impairment are exceeded by myopia's prevalence. 2 The prevalence of myopia makes it one of the most common vision problems worldwide. Roughly 25 percent of the European population is impacted, while 80 percent of the Asian population is confronted.³ Since myopia is the most common refractive error in the world⁴, a lot of research has been done on the relationship between myopia and the axial length of the eye. This research demonstrates a positive association between myopia's actual values and antero posterior diameter.⁵ According to estimates, about 1.5 billion individuals, or 22 percent of the global population, have myopia.⁶ In conjunction with the rising prevalence of myopia, the number of Eximer laser and Femto Lasik treatments for the treatment of shortsightedness has increased dramatically.⁷ When deciding between different types of refractive surgery for myopic eyes, the thickness of the cornea (CCT) is an important concern because if the cornea is thin there will be a risk of postoperative thinning of the cornea postoperatively.⁸ Myopia is becoming increasingly common, although research into its link to central corneal thickness (CCT) has yielded contradictory findings. This study's objective was to assess the relationship between shortsightedness and Central Corneal Thickness in a sample of hospital patients in Islamabad.

Materials and Methods

A total of 186 participants participated in this comparative cross-sectional study. Patients with myopia were split from those with Emmetropia. With 5% CI and 95% power, the sample size was calculated using the WHO calculator. Non-probability consecutive sampling was used for the sampling. The study lasted for six months, from January 2022 to June 2022, and took place at a tertiary care hospital eye department in Islamabad. Individuals were added to

the study if they met the inclusion criteria and those who didn't were left out.

The hospital's ethics committee granted their permission for the study's conduct. Patients who checked into the hospital were routinely given an auto-ref [NIDEK ARK 1a] and had their eyes measured by an optometrist, who also measured their visual acuity. After that, they all went to see an ophthalmologist for a thorough eye exam. Patients were given information about the study and given the chance to provide their consent before any examinations were performed. Candidates who were following the inclusion criteria for the said study were put into one of two groups at random. Myopic patients made up GROUP 1, whereas those with Emmetropia were split into GROUP 2. Basic data and medical tests were recorded on a pre-printed Performa. The TOPCON SP2000P SPECULAR MICROSCOPE was then used to perform a Pachymetry analysis on the samples. The right eye was used for CCT measurements to ensure consistency, ease of analysis, and minimal bias. Undergraduate researchers collected CCT values and found the average of the three readings for each patient.

Data were analyzed using SPSS version 22. Frequency and percentage analyses were calculated to provide descriptive statistics. Average and standard deviation values for the ages of patients, CCT measurements, and degrees of myopia were calculated. The average central corneal thickness (CCT) of Shortsighted as well as Normal eyes people were evaluated with a t-test for independent samples.

Results

A total of 186 candidates participated in the research. Both males and females took part in the research. About 56% of the candidates were men, and 44% were women. Participants ages ranged from 16 to 49, with a mean of 32 (16-49). The average refractive error of myopic people was -3.3522 dioptres, with a standard deviation of ± 3.65723 . The refractive errors were between -19.75D and -0.75D. Compared to a mean Ametropia of +0.0345DS with an SD of ± 0.35084 in the control group. Refractive errors ranged from a high of -0.50 dioptres to a low of +0.50 dioptres. In the control group, the average central corneal thickness was 522.30 microns and a standard deviation of ± 29.563 .

Table-1 Table of Descriptive Statistics showing mean Central Corneal Thickness in Myopes and Emmetropes

Status	Refraction	CCT in microns	
Emmetropes	Mean	.0349	522.30
	N	93	93
	Std. Deviation	.35084	29.563
	Minimum	.50	439
	Maximum	-.50	619
Myopes	Mean	-3.3522	515.18
	N	93	93
	Std. Deviation	3.65723	28.972
	Minimum	-.75	440
	Maximum	-19.25	576

Their sizes varied from 439 microns to 619 microns. The average CCT of myopic people was 515.18 microns, and the standard deviation was ± 28.972 microns. The relationship between CCT in myopic eyes and CCT in emmetropic eyes was analysed using a paired t-test. The data show that the average CCT of myopic eyes was lower, at 515.18 microns (SD = 28.972) than that of emmetropic eyes, at 522.30 microns (SD = 29.563). However, as the P value was only 0.09, the relevance of the test was not significant.

Table-2: Tabular Form of Paired T Test among CCT in Myopes and Emmetropia

		TEST OF LEVENE'S EQUALITY OF MEANS T-TEST		EQUALITY OF VARIANCES					
CCT in microns	Assumption of equal variances	F value	Significance	T-test value	Degree of Freedom	(2 Tail Sig.)	Standard Error Difference	Confidence interval of Difference	95% Lower Upper
	No equal variances are assumed.	.027	.869	1.658	184	.099	4.292	-1.350	15.586
				1.658	183.925	.099	4.292	-1.350	15.587

Discussion

The current study's purpose was to investigate the relationship between myopic and emmetropic patients with respect to their central corneal thickness. Our findings were consistent with respect to age with those of B. Koucheki, et al.²² who reported that the participants of the study's average age were 28.7, SD \pm 7.7 years, and a range of 18 to 55 years. The average age in our sample was 32. In a study of Korean myopes; S. Lee et al.²⁰ revealed that the patients' ages ranged from 22 to 46, with a mean age of 30.05.

At least 2.2 billion individuals throughout the world suffer from some degree of near- or far-sightedness. Out of these stats roughly half, or 1 billion, of these cases, had an avoidable or untreated visual loss.¹¹ Uncorrected refractive error is responsible for the moderate-to-severe distant vision impairment or blindness of 88.4 million people globally¹⁰. Currently, the main factor contributing to vision impairment is short-sightedness. The impact of refractive status on CCT has been the subject of conflicting reports³. Myopia was linked to thicker central corneal thickness⁸, according to one study, however, other studies have shown no link between myopia and

CCT⁹. This study showed the relationship between CCT in myopic and emmetropic eyes. The average refractive error for myopes was -3.352 dioptres and the average thickness was 515.18 microns, while the average refractive error for emmetropes was +0.345 dioptres and the average thickness was 522.30 microns. The average central corneal thickness was 531.9 36.80 microns, according to a similar study¹⁹. Myopia seems to tend to cause thinner corneas, but statistical analysis of our study revealed no significance with a p-value of.09. This outcome is consistent with the vast majority of earlier investigations. A lack of correlation between CCT and refractive error was also found in studies by Liu Z²², Pauline Cho., et al.²³, and Pedersen et al.²⁴. Same research revealed that the cornea of people with myopia is noticeably thinner than that of Emmetropes, but no relationship found among myopia and CCT.³ People with myopic eyes had a mean central corneal thickness of 515.8 microns, whereas those with emmetropia had a mean thickness of 522.30 microns. Thinner corneas were reported by Nemesure. et al. in highly myopic individuals¹⁹. Our findings contradict those of Muthukrishnan., et al.²⁵, who found thicker corneas in high myopia. Similar results were found when comparing the average central corneal thickness of myopes in this study to that of studies including Spanish Caucasian myopic people aged 20–40 (550.12 m),³ Saudi Arabians (543.80 m), and a Caucasian population in the United States (550.40 m).¹² It's possible that the older participants in this study led to a reduction in central corneal thickness compared to earlier experiments. It might also be brought on by the previously noted lower corneal thickness in blacks compared to Caucasians. In a previous study, the corneal thickness of 209 healthy eyes' centre and periphery was assessed. The average central thickness was 523 ±39 microns (standard deviation) ¹². The average thickness of the periphery was 660 microns ± 76 (SD). The male and female corneas, as well as the right and left eyes, did not significantly differ from one another. The centre corneal thickness and refractive error did not correlate. This is associated with the results of our investigation showing no association between refractive error and central corneal thickness. CCT in the control group averaged 522.30 microns (29.563SD), but in the myopic group, it was 515.18 microns (28.972SD). According to the results of this study, myopes and Emmetropes do not differ significantly in CCT. That is contradictory to previously done studies that show a strong positive correlation among different degrees of myopes^{14, 15}.

Typical CCT for the different types of myopia ranged from 528 to 538 microns, which is important to keep in mind¹⁶. Although the conclusion was statistically significant, the therapeutic effects of a CCT range of 10 microns remain unknown. In research of 2983 eyes from Spain, Bueno-Gimeno et al.¹⁷ discovered that myopes ([6 D]) had a higher CCT (577.76 microns) than moderate (536 microns) and mild (535 microns). In contrast, there was either no association or a negative connection in other studies with smaller samples¹⁸.

Conclusion

In conclusion, myopic and emmetropic eyes have the same CCT. Myopic people's corneas don't seem to be affected by the growing changes in their ocular tunics. This alleviates the need for the patient and the ophthalmologists to undergo yet another test.

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