Central Corneal Thickness Measurement of Non-glaucomatous Adults Attending the Eye Clinic of Ahmadu Bello University Sick Bay, Samaru, Zaria

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Background: Central Corneal Thickness (CCT) is the measurement of the centre of the cornea and is a parameter for assessing the corneal health status.[1] CCT provides valid information about corneal physiological condition and possible changes associated with diseases, trauma, and hypoxia.[2] Normal mean values for CCT range between 521µm and 554µm. Due to racial and age differences, this is an important factor to consider when measuring intra-ocular pressure (IOP).[3] The CCT is reported to influence the IOP measurement during applanation tonometry, with over estimation of IOP in thicker corneas and an underestimation in thinner corneas. The objectives of the study were; to determine the mean Central Corneal Thickness (CCT) of non-glaucomatous adults attending the Eye Clinic of Ahmadu Bello University (ABU) Samaru, Zaria and to determine the correlation between CCT and IOP, age, gender, and refractive error.

Methods: Consenting adults who met the inclusion criteria were selected using simple random sampling. The inclusion criteria were; participants >18 years of age with no history of diabetes, contact lens wear, ocular trauma, previous eye surgery, glaucoma, corneal scar, use of drugs that affect the cornea such as carbonic anhydrase inhibitor, prostaglandins, and steroids. An IOP of < 21 mmHg and refractive error. The participants had visual acuity assessment for both distance and near and detailed ocular examination. The IOP was measured using Perkins MK3 hand-held applanation tonometer taking average of 3 readings, while CCT was measured taking average of five readings using Pacscan 300 AP ultrasonic pachymeter, in the multiple point, multiple reading mode. Data was entered in a pretested questionnaire and analysed using Statistical Package for the Social Sciences (SPSS) version 23.0.

Results: There were 80 participants with more females recorded in the study, 55(68.7%). The mean age of all participants was 40.41 years (SD±13.51). The combined mean CCT for both eyes was 531.18µm (95% CI, 522.65 – 539.71), Table 1. A moderate inverse correlation shows the CCT decreases with increasing age (r = -0.42, p = 0.000), Table 2, and a weak linear correlation with presbyopia was significant (r = 0.23, p = 0.05), Table 3. No significant correlation was found between CCT and IOP, gender and other types of refractive error.

Conclusion: The mean CCT found in this study (531.18 ± 38.33µm) was slightly lower but comparable to earlier studies in Nigerians by Mercieca *et al*,[4] 535 ± 38µm and Babalola *et al*, 537.9µm.[5] Iyamu *et al*[6] reported a much higher

Table 1: Descriptive statistics of CCT according to gender

Variable Sex	CCT(µm) Mean (n)	±SD
Male	528.67 (25)	43.57
Female	533.69 (55)	34.5
Combined	531.18 (80)	38.33

**p = 0.40*

Table 2: Descriptive statistics of CCT according to age

Variable Age (Years)	CCT(µm) Mean (n)	±SD
20 - 29	544.74 (17)	38.62
30 - 39	536.32 (12)	36.21
40 - 49	529.47 (25)	35.67
50 - 59	524.56 (19)	32.38
60 - 69	520.81 (7)	36.73

**p < 0.001*

Table 3: Correlation between CCT and age, IOP and refractive status

Variable	Pearson correlation(r)	Significance test (2-tailed)
Age(years)	-0.42	<0.01
IOP(mmHg)	-0.21	0.63
Refractive Status		
Emmetropia	0.03	0.76
Hypermetropia	-0.67	0.55
Myopia	-0.18	0.11
Astigmatism	0.68	0.54
Presbyopia	0.23	0.03

value of 547 ± 29.5. The very significant negative correlation between age and CCT shows that the CCT was progressively thinner with increasing age. While this finding agrees with several investigators who reported a significant effect of age on CCT,[7] others found that age did not affect CCT.[8] An average of 5.0 - 7.0μm decrease in CCT in Nigerians for every 10 years increase in age have been reported.[7] The density of keratocytes in the corneal stroma decreases with age with breakdown of collagen fibres as part of the normal aging process. These changes are the most likely reasons for the observed reduction in CCT with age.[9]

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