

Relationship Between Intraocular Pressure and Central Corneal Thickness in Adults in Port Hacourt City Local Government Area

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Introduction: Intraocular pressure (IOP) is the pressure sustained by the aqueous humor within the eyeball [1]. IOP is of inherent physiologic importance in maintaining the structure and function of the eye [2]. Intraocular pressure is the easily modifiable risk factor in the treatment of glaucoma and its value can be influenced by the central corneal thickness. Identifying the pattern of IOP and CCT in a population with respect to age and gender is important as these vary in different populations.

Methods: A population-based descriptive cross-sectional study conducted among adult Nigerians aged 18 years and older. Multi-staged random sampling technique was used to select eligible subjects for the study. All participants had optical pachymetry, applanation tonometry, fundus examination and visual acuity measurement done.

Results: Age and sex distribution of study population: A total of four hundred and eighty subjects participated in the study. There were 212 males (44.2%) and 268 females (55.8%) giving a male to female ratio of 1: 1.3. The mean age of the study population was 43.0±14.2 years. Age ranged from 18 to 91 years.

Distribution of intraocular pressure according to age group and gender: The average intraocular pressure (IOP) of the study population was 12.5±3.0mmHg and it varied with age and gender. The average IOP in males was

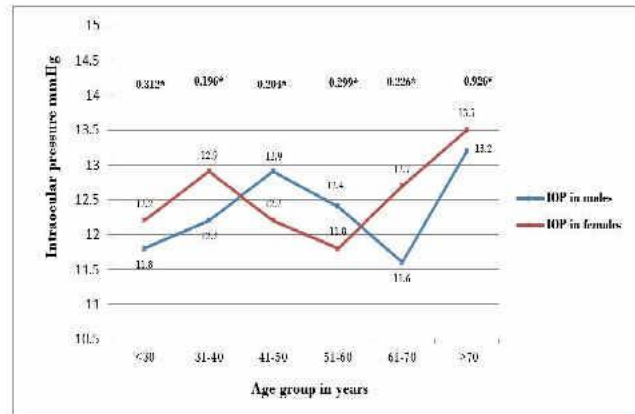


Fig. 1: Distribution of mean intraocular pressure by age and gender

Key * represents p-value of IOP in different age groups according to gender. (The p-values were determined using the independent t-test)

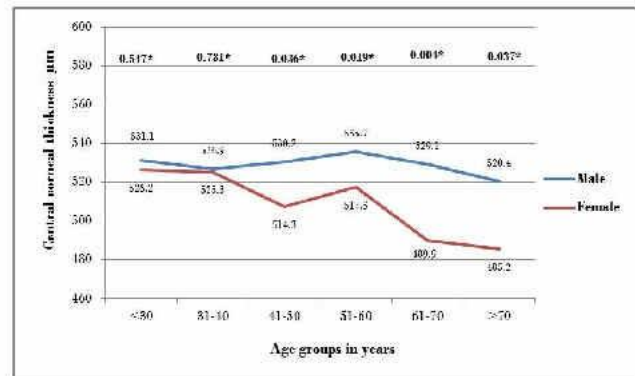


Fig. 2: Pattern of CCT with age and gender

Key * represents p-values of CCT in different age groups according to gender

12.6±3.0mmHg and while females was 12.4±3.0mmHg in females. There was no statistically significant difference in IOP ($p > 0.05$) between genders at different age groups (Fig. 1). Pattern of central corneal thickness according to age group and gender: The mean CCT in males was 529.9 ±38.9µm while in females was 518.4 ±36.1µm. Central corneal thickness was found to be higher in males than females in all age groups with statistically significant difference ($p < 0.05$) (Figure 2).

Intraocular pressure and central corneal thickness in different genders: There was a statistically significant relationship between IOP and CCT in the study population. In the general population, a unit rise in CCT (µm) would increase the IOP by 0.011mmHg (CI 0.004 to 0.018).

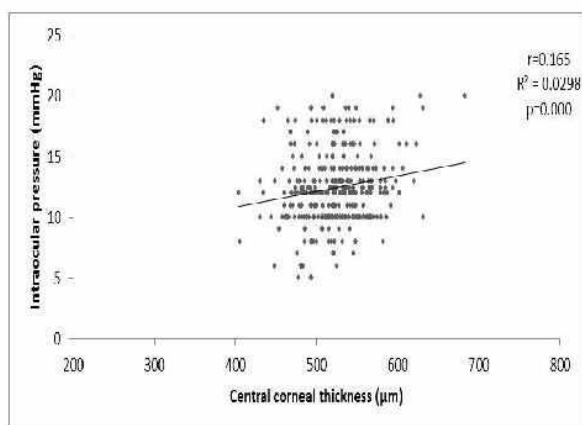


Fig. 3: Relationship between IOP and CCT in the study population

Bivariate linear regression analysis

Discussion: Majority of the study population had central corneal thickness between 521 and 540 µm. CCT was higher in males (529.9 ±38.9µm) than females (518.4 ±36.1 µm). This difference was statistically significant only in those aged more than 41 years. This finding is in agreement with other studies conducted in Nigerians,^[3,4] Africans,^[5] and Caucasians.^[6] However the OHTS reported females to have thicker corneas.^[7] There was also no statistically significant relationship between IOP and age in this study. A significant positive correlation between corneal thickness and IOP was observed in this study. An increase in IOP of 1.1 mmHg was observed for each 100 µm increase in central corneal thickness. Analyses

from several studies^[10,11] have reported that the difference in the GAT-measured IOP per 100-µm difference in CCT ranges from 1.1 to 3.2 mm Hg consistent with the findings from this study, where an increase of 1.1mmHg was noted.

References

1. Fatt I, Weissman, Barry A. PD. Physiology of the Eye: An introduction to the vegetative functions. 2nd ed. Stoneham: Butterworth-Heinemann; 1992.
2. Leske MC. The epidemiology of open-angle glaucoma: a review. Am J epidemiol 1983;118(2):166-191.
3. Egwuonwu NNN-. Central Corneal Thickness in Nigerians: A population-based study in Lagos State. In: OASIS, editor. Glaucoma Clinical Research. Hall B/C: ARVO 2012 Abstract Search & Itinerary Builder; 2012; 462.
4. Mercieca K, Odogu V, Fiebai B, Arowolo O, Chukwuka F. Comparing central corneal thickness in a sub-Saharan cohort to African Americans and Afro-Caribbeans. Cornea 2007;26(5):557-60.
5. Eballe AO, Koki G, Ellong A, Owono D, Epée E, Bella LA, *et al.* Central corneal thickness and intraocular pressure in the Cameroonian nonglaucomatous population. Clin Ophthalmol 2010;4:717-724.
6. Sanchis-Gimeno JA, Lleó-Pérez A, Alonso L, Rahhal MS. Caucasian emmetropic aged subjects have reduced corneal thickness values: emmetropia, CCT and age. Int Ophthalmol 2004;25(4):243-246.
7. Gordon MO. The Ocular Hypertension Treatment Study. Arch Ophthalmol 2002;120(6):714.
8. Iyamu E, Ituah I. The relationship between central corneal thickness and intraocular pressure: a comparative study of normals and glaucoma subjects. Afr J Med Med Sci 2008;37(4):345-353.
9. Onakoya A. Pattern of intraocular pressure in Lagos. Niger J Ophthalmol 2005;13(1):1-3.
10. Shimmyo M, Ross AJ, Moy A, Mostafavi R. Intraocular pressure, Goldmann

Abstracts

- applanation tension, corneal thickness, and corneal curvature in Caucasians, Asians, Hispanics, and African Americans. *Am J Ophthalmol* 2003;136(3):597-8;
11. Ehlers N, Thorkild B, Sperling S. Applanation Tonometry and central corneal thickness. *Acta Ophthalmol Scand* 2009; 53(1):34-43.