Normative data for peripapillary retinal nerve fibre layer OCT scans in patients of African descent.

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We present normative OCT peripapillary data for healthy adults of African descent and wish to emphasise the lack of normative control data from all regions of sub-saharan Africa.

We read with interest the recent article by Yashadhana et al calling for improved diversity in global eye health leadership (1). Leadership is not the only area of eye health where diversity could be improved. We are currently investigating Tanzanian Endemic Optic Neuropathy (TEON): a bilateral subacute optic neuropathy of unknown aetiology affecting young people in Tanzania (2). The condition demonstrates similar clinical and temporal characteristics to Leber's Hereditary Optic Neuropathy (LHON). As part of the TEON Study – a collaborative research project that aims to identify the causes of TEON – we sought to compare the optical coherence tomography (OCT) findings of TEON and LHON, utilizing a new OCT scanner (Topcon 3D OCT-1 Maestro, Topcon Medical Systems, Oakland, NJ, USA) at Muhimbili National Hospital.

To allow thorough comparison of OCT data we need a representative normative dataset. Only 20% of the normative dataset of our OCT analysis software contains data from people of African descent (AD) and only 45% were under the age of 40 (3). The African Descent and Glaucoma Evaluation Study (ADAGES), a study that investigated glaucoma in American AD patients, showed significant baseline differences in optic nerve parameters between healthy participants of African and European descent (4).

We therefore conducted a literature search for normative data for OCT peripapillary retinal nerve fibre layer (pRNFL) thickness measurements in healthy adult AD participants, the results of which can be seen in Table 1.

Table 1. Studies reporting normative pRNFL OCT data for adult participants of African descent.

Study first author	Location	Year	Eyes (n=)	Weight*	pRNFL	tRNFL	iRNFL	sRNFL	nRNFL
Mashige	South Africa	2017	600	11.88	110	73.63	135.06	131.96	87.24
Girkin	USA	2010	315	6.24	103.69	66.48	135.12	128.83	84.3
Sani	Nigeria	2016	220	4.36	104.2	67.2	129.2	135.3	85.1
Ismail	South Africa	2019	132	2.61	108.7	74.8			77.7
Blumberg	USA	2016	103	2.04	93.98	60.59	122.71	119.16	73.42
Ocansey	Ghana	2020	100	1.98	102.4	66.8	133.6	131.5	76.7
Knight	USA	2012	51	1.01	93.9	57.8	125.2	119.6	73
Rao	USA	2015	50	0.99	97.18		130.04	121.16	
Racette	USA	2005	42	0.83	114.86	84.55	141.69	149.79	82.86
Poon	USA	2018	40	0.79	92.97	62.09	118.65	114.47	76.49
Seraji-Bozorgzad	USA	2016	27	0.53	100.9	68.9	133.7	128.1	72.4
Budenz	USA	2007	27	0.53	101.1				
Alasil	USA	2013	26	0.51	99.2				
Kimbrough	USA	2015	14	0.28	100	67	135	126	73
Weighted average (AD participants)					**105.0**	**69.6**	**132.6**	**130.1**	**82.9**
OCT software average (all ethnicities)					**104.0**	**70.6**	**123.9**	**116.4**	**80.6**

*Weight based on sample size relative to the median sample size.

pRNFL=average peripapillary RNFL thickness; tRNFL=average temporal quadrant peripapillary RNFL thickness; iRNFL=average inferior quadrant peripapillary RNFL thickness; sRNFL=average superior quadrant peripapillary RNFL thickness; nRNFL=average nasal quadrant peripapillary RNFL thickness.

The difference between the averages is in agreement with studies that have previously examined ethnic differences in pRNFL OCT thicknesses – namely that AD patients have thinner temporal peripapillary RNFL thicknesses and thicker RNFL in the other quadrants (5).

It should be noted that many of these RNFL studies concern glaucoma, primarily a disease of the elderly, hence normative data may be skewed by age, as well as differences in scan equipment, scan technique, and optic disc morphology.

The variation in RNFL thicknesses seen in Table 1 shows the difficulties in comparing OCT scan data and emphasises the need for more extensive normative control data from all regions of sub-saharan Africa. This article hopefully highlights the heterogenous nature of the term 'African descent' and that there are no published normative datasets for East African patients.

References

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