

PURPOSE

There are few studies that enable direct comparison of the ocular dimensions of subjects of different races¹⁻². Therefore, it is important to characterise the different ocular structures and visual parameters because in a globalised world it is easy for people of different races and ethnicities to come for routine check-ups. This characterisation makes possible to detect alterations or pathologies.

There are many publications on the changes that the eyeball undergoes with age in the Caucasian and Asian population³, but few or none on the African population⁴. Therefore, the aim of this study is to establish the basis for a characterisation study of the Senegalese population that will serve as a starting point for a more complete study.

MATERIAL & METHODS

This study was conducted with 233 subjects screened at the "Clinique Des Yeux" in Dakar (Senegal) during the period July to September 2023. Patients were grouped by age range, as shown in table 1 and 2. Patients included in this study met the following inclusion criteria: Senegalese persons of either sex who have always lived in Senegal, who have not undergone previous refractive surgery and have no previous ocular pathology.

When patients arrived at the clinic, corrected and uncorrected intraocular pressure (IOP), central corneal thickness (CCT), pupillary diameters, keratometry (K1/K2) and objective refraction (Rx) were taken. All this was performed using NIDEK's TONOREF III equipment.

Statistical analysis was carried out using an SPSS statistical package. The parameters analysed were visual abilities as a function of age groups. The analysis of the variables was performed with an ANOVA (analysis of variance). Differences were considered statistically significant when the p-value was less than 0.05 with a 95% confidence interval. Data were considered statistically significant for p<0.05.

RESULTS

The results obtained are shown in the attached tables, in which it can be seen that both the keratometry values (k2), the pupilar diameter, as well as the refraction of the left eye, show statistically significant changes with age. This is consistent with previous studies showing that pupil size decreases with age, as does astigmatism, which is affected by changes in the force that the eyelid exerts on the cornea, which weakens with age.

It has also been described that refraction changes throughout life and is related to both anatomical and environmental changes related to the subject.

Age(years)	N	K1 RE (mm)	K2 RE (mm)	K1 LE (mm)	K2 LE (mm)	RX RE (mm)	RX LE (mm)
p-valor		0.16	0.32	0.22	0.04	0.56	0.11
0 to 9	8	43.9±2.1	45.2±2.1	43.9±1.8	45.5±2.4	-0.3±1.2	-0.6±1.6
10 to 19	11	43.6±1.7	45±1.7	43.7±1.6	45.1±1.8	-0.7±2.1	-0.7±1.1
20 to 29	25	42.3±1.4	43.6±1.4	42.45±1.3	43.7±1.6	-0.4±1.2	-0.3±1.3
30 to 39	38	42.5±1.6	43.3±1.6	42.63±1.5	43.5±1.6	-0.3±1.2	-0.3±1.2
49 to 49	24	40.2±1.6	40.5±1.7	40.25±1.7	41±1.7	0.5±1.5	0.0±1.7
50 to 59	25	42.9±1.4	43.7±1.5	42.98±1.3	43.8±1.5	0.25±1.3	0.5±1.2
60 to 69	24	43.2±1.5	44.1±1.5	43.4±1.5	44.4±1.6	0.1±2.3	0.4±1.9
70 to >	10	43.3±1.6	44.5±2.2	42.9±1.4	44.6±2.3	0.2±1.9	0.3±1.6

Table 1: average results obtained from the spherical equivalent of refraction and keratometry.

Age(years)	N	IOP (mmHG)	IOPC(mmHG)	CCT (um)	Pupil Ø(mm)
p-valor		0.56/0.57	0.84/0.70	0.17/0.11	0.00/0.00
0 to 9	10	16.9±4/16.5±4	17.4±5/17.2±4	535±31/533±26	6.1.6±0.8/6.5±0.9
10 to 19	17	15.7±3/15.2±4	15.7±3/15.5±3	548±37/541±39	5.7±1.1/5.6±1.1
20 to 29	38	14.5±3/14.2±2	15.4±2/15±2	527±33/530±34	5.8±1.0/5.8±1.2
30 to 39	51	14.2±3/14.2±3	15±3/14.8±2	530±28/532±30	5.2±0.8/5.1±0.8
49 to 49	42	16.6±3/16.5±3	17±2/16.8±2	538±29/539±27	5.4±0.8/4.9±0.8
50 to 59	28	14.4±4/14.4±3	15.8±4/15.9±2	516±34/513±31	4.8±0.6/4.8±0.8
60 to 69	30	14.8±4/15.1±2	16.8±6/14.8±3	525±34/526±36	4.5±0.9/4.3±0.9
70 to >	13	15.8±5/14±4	16.8±6/14.8±3	532±27/526±26	3.9±0.9/4.0±0.7

Table 2: results of corrected and uncorrected intraocular pressure, central corneal thickness and pupillary diameter obtained.

CONCLUSIONS

This work shows change in parameters very similar to those of other races and ethnicities. In the course of this work, it would be appropriate to amplify these analyses by comparing them with results measured in populations in other African countries and by comparing them with those studied in other countries on other continents.

References:

- [1] Effect of Gender and Race on Ocular Biometry; Kenneth J Hoffer/Giacomo Savini
- [2] A review of African studies on central corneal thickness; Rampersad, Nishanee; Hansraj, Rekha
- [3] Angle-closure glaucoma in Asians: comparison of biometric and anterior segment parameters between Japanese and Chinese subjects; Henrietta Ho 1, Mineo Ozaki, Takanori Mizoguchi, Shamira A Perera, Daniel H Su, Mingguang He, Tien Y Wong, Monisha E Nongpiur, Tin Aung.
- [4] Analysis of corneal biometry in a black South African population (2019); Thariq Bagus, Kerry Alberto, Michel Muteba, Aubrey Makgotloe