

All biometric components are important in anisometropia, not just axial length

Background No study to date has looked into the relationship between ocular biometrics with anisometropia exclusively; therefore, the purpose of this study was to determine the relationship between anisometropia and ocular biometrics.

Methods In a cross-sectional study with multistage cluster sampling, 6311 people in the 40–64-year-old age group from the population of Shahroud, Iran, were selected. Of these, 5190 people participated in the study. For all participants, tests for visual acuity, cycloplegic and non-cycloplegic refraction, slit lamp test and fundoscopy were performed. All participants underwent biometric examinations using the Allegro Biograph (WaveLight AG, Erlangen, Germany).

Results Asymmetry of axial length, corneal power, vitreous chamber depth, anterior chamber depth, lens thickness and lens power were significantly more among participants who were anisometropic than those who were non-anisometropic. The correlation of anisometropia with axial length asymmetry was 0.730, 0.773 with corneal power, 0.183 with anterior chamber depth and 0.311 with lens power ($p < 0.001$). In a multiple linear regression model, anisometropia was found to have significant associations with axial length asymmetry (standard coefficient (SC)=0.905), corneal power asymmetry (SC=0.350), lens power asymmetry (SC=0.454), nuclear opacity asymmetry (SC=0.074) and age (SC=0.28) ($R^2=80.1\%$). According to the linear regression model, corneal power had the strongest association with anisoastigmatism.

Conclusions Axial length asymmetry has the strongest correlation with anisometropia; nonetheless, other components of ocular biometrics such as corneal power, lens opacity, lens power and anterior chamber depth are related to anisometropia as well. More than 80% of changes in anisometropia can be explained with changes in factors other than asymmetry of ocular biometrics and lens opacity.