SUPPLEMENTARY MATERIAL

Supplementary Methods 1

Ophthalmic history: Self-reported ophthalmic history was elicited from participants during the health assessment and included diagnoses of glaucoma, age related macular degeneration, cataract and diabetic retinopathy. Frequency of utilisation of optometry in the community during the previous year and history of cataract surgery in either eye was also documented.

Visual acuity (VA): VA was evaluated using mounted retro-illuminated Early Treatment Diabetic Retinopathy Study (ETDRS) LogMAR (Logarithm of the Minimum Angle of Resolution) charts for each eye in full room lighting conditions.

Refractive error: was measured in each eye as a mean of three readings using a Shin Nippon Accuref-K 900 autorefractor (Rexxam Co. Ltd., Osaka, Japan) without routine cycloplegia. Spherical equivalent (SE) was calculated as the spherical correction plus half the cylindrical power.

Ocular Response Analyser (ORA; Reichert Ophthalmic Instruments Inc, Depew, New York, USA), was used to measure the intraocular pressure (IOP) and ocular biomechanical measurements for each eye. Three measurements were taken for each eye and a maximum of five measurements were attempted for each eye. The following values were recorded at each measurement: Goldmann-correlated IOP (IOPg), corneal compensated IOP (IOPcc), corneal resistance factor (CRF), corneal hysteresis (CH), waveform score (WFS) and the date and time of the measurement. The mean of three ORA measurements from each eye with the best WFS were calculated and included in the analyses.

Pupils were dilated using tropicamide 1% eye drops

Retinal stereophotography: Digital 45° colour fundus sequential stereo paired photographs centred on the optic disc were taken for each eye using a digital retinal camera (Canon CX-1, Tokyo, Japan).

Spectral-domain optical coherence tomography (SD-OCT): Spectralis Heidelberg Retina Angiograph + Optical Coherence Tomography (HRA+OCT; Heidelberg Engineering, Heidelberg, Germany) was used to obtain optic disc images which allow for circumpapillary retinal nerve fibre layer (cRNFL) thickness measurement. Each cRNFL image acquisition was manually centered on the optic disc and the following conditions were used: resolution mode: high speed; c-curve: 7.7 mm; circle diameter: 12° (fixed); size X: 768 pixels; size Z: 496 pixels; and Automatic Real Time function (ART) mode: 100 images averaged; acquisition software versions 5.10.20 to 6.7.21.0. The cRNFL thickness was automatically segmented using Heidelberg Eye Explorer (HEYEX) software.

NICOLA Study image grading and quality assurance

SD-OCT cRNFL Scan Analysis: The cRNFL thickness was automatically segmented using HEYEX software. Each cRNFL scan was inspected for quality assurance purposes. Scans with minor segmentation errors were adjusted manually using the HEYEX software functions when possible. Scans judged to have significant artefact (cropped cRNFL, not centred on optic disc) or be grossly abnormal (significant vitreoretinal traction, hyporeflective intraretinal spaces, epiretinal membrane) were excluded from analysis. Fovea disc (FoDi) alignment was adjusted post acquisition if required. A proprietary measure of scan quality (Q) ≥15 was considered acceptable

as per the manufacturer's recommendations. Global and sectoral raw values and classifications were automatically exported.

Cardiovascular and anthropometric tests were performed: Two brachial blood pressure and heart rate readings were recorded at room temperature whilst seated using the M10-IT blood pressure monitor (OMRON^{TM}, Hoofddorp, The Netherlands) and the mean heart rate, mean systolic and mean diastolic blood pressure results were calculated. Body height was measured using the Seca 240 wall mounted measuring rod (Seca, Birmingham, UK). Weight was measured using electronic floor scales (Seca, Birmingham, UK). Waist and hip measurements were recorded using measuring tape (SECA, Birmingham, UK) when possible, excluding participants who were wheelchair bound or unable to stand. Ocular perfusion pressure (⅔(mean arterial BP – IOP)), mean arterial pressure (diastolic BP + ⅓(systolic BP – diastolic BP)), systolic ocular perfusion pressure (systolic BP – IOP), diastolic ocular perfusion pressure (diastolic BP – IOP), waist / hip ratio and body mass index (BMI; weight (kg) / height (m^2)) were calculated from available raw data.

Cognitive and psychiatric assessments: Mini-mental state examination (MMSE) and Montreal Cognitive Assessment (MCoA) were performed by the participant to assess cognitive function.

Blood tests: Blood samples were taken for total cholesterol levels, direct low-density lipoprotein (LDL), high density lipoprotein (HDL)-cholesterol, triglycerides and genotyping.

Supplementary Methods 2

Independent variables included in the multivariable association analyses with Goldmann correlated intraocular pressure (IOPg), corneal compensated IOP (IOPcc) and mean global circumpapillary retinal nerve fibre layer (cRNFL) thickness

	IOPg model	IOPcc model	cRNFL model
Age at health assessment	✓	✓	✓
Sex	✓	✓	✓
Eye	✓	✓	✓
Dwelling (urban versus rural)	✓	✓	✓
Education attainment level (highest qualification attained)	✓	✓	✓
Smoking status (ex-smoker versus current smoker)	✓	✓	✓
Smoking status (ever versus never)	✓	✓	✓
Smoking status (current versus never)	✓	✓	✓
Diabetes mellitus (self-reported history of diabetes or random glucose ≥ 11.1 mmol/L or HbA1c ≥ 6.5% or the use of antidiabetic medication)	✓	✓	✓
Hypertension (self-reported history of high blood pressure or systolic blood pressure ≥ 140 mmHg or diastolic blood pressure ≥ 90 mmHg or use of antihypertensive medication)	✓	✓	✓
High cholesterol (self-reported history of high cholesterol or total cholesterol ≥ 6.2 mmol/L or the use of lipid lowering medication)	✓	✓	✓
Cardiovascular disease (self-reported angina or heart attack)	×	×	✓
Cerebrovascular disease (self-reported stroke or transient ischaemic attack)	×	×	✓
Parkinson's disease (self-report)	×	×	✓
Alzheimer's disease (self-report)	×	×	✓
Cataract surgery (self-report; right eye or left eye)	✓	✓	✓
Body mass index (BMI)	✓	✓	✓
Height (m)	✓	✓	✓
Weight (kg)	✓	✓	✓
Waist (cm)	✓	✓	✓
Waist / hip ratio	✓	✓	✓
Spherical equivalent	✓	✓	✓
Refractive error (categorical)	✓	✓	✓
Vertical cup to disc ratio (VCDR)	×	×	✓
Goldmann correlated IOP (IOPg)	×	×	✓
Corneal compensated IOP (IOPcc)	×	×	✓
Corneal hysteresis (CH)	✓	✓	✓
Corneal resistance factor (CRF)	✓	✓	✓
Mean ocular perfusion pressure (MOPP)	×	×	✓

Systolic ocular perfusion pressure (SOPP)	×	×	✓
Diastolic ocular perfusion pressure (DOPP)	×	×	✓
Mean arterial pressure (MAP)	✓	✓	✓
Systolic blood pressure (SBP)	✓	✓	✓
Diastolic blood pressure (DBP)	✓	✓	✓
Heart rate	✓	✓	✓
American College of Cardiology / American Heart Association (ACC/AHA) hypertension stages	✓	✓	✓
Number of falls in past year	×	×	✓
Plasma total cholesterol levels	✓	✓	✓
Plasma direct low-density lipoprotein (LDL)	✓	✓	✓
Plasma high density lipoprotein (HDL)-cholesterol	✓	✓	✓
Plasma triglycerides	✓	✓	✓
National Eye Institute Visual Function Questionnaire 9 (NEI VFQ 9; composite score)	×	×	✓
Mini mental state examination (MMSE) score (≥24 – Normal; <24 – Cognitive decline)	×	×	✓
Montreal Cognitive Assessment (MCoA) score (≥26 – Normal; <26 – Cognitive decline)	×	×	✓
Glaucoma (ISGEO definition)	✓	✓	✓
Anatomical Therapeutic Chemical classifications: Parkinson's disease drugs (ATC N04), lipid lowering drugs (ATC C10), antihypertensive drugs (ATC C02), calcium channel blockers (ATC C08), beta blocker drugs (ATC C07) and renin-angiotensin system drugs (ATC C09)	✓	✓	✓

ISGEO - International Society Geographical and Epidemiological Ophthalmology

✓ - included in the analysis; × - not included in the analysis