One does not detect normal-tension glaucoma (NTG) until the patient develops glaucomatous optic neuropathy, and eye care providers do not document the appearance of the optic disc in many patients. For these reasons, patients with NTG often have severe optic disc disease and visual field loss by the time the disease is diagnosed. This article shares the results of a pilot study that my colleagues and I conducted in order to alert clinicians to the high prevalence of NTG in American Indian/Alaska Natives so that they do not miss the wolf in sheep’s clothing.

METHODS
Population
Our study included three tribes from Oregon, Washington, and Idaho. We used the tribal enrollment database to perform an age-stratified, randomized sampling of individuals aged 40 and older.

Examinations
We performed a baseline examination for glaucoma that included pachymetry, keratometry, presenting and best-corrected vision, IOP measured with the Tono-Pen XL (Medtronic Xomed Ophthalmics, Inc., Minneapolis, MN), anterior chamber assessment by limbal chamber depth, visual field testing using Frequency Doubling Technology perimetry program C-20-5 (Carl Zeiss Meditec Inc., Dublin, CA), confocal scanning laser ophthalmoscopy (CSLO), and nonmydriatic digital imaging of the lens, optic disc, and fundus. Participants also completed a detailed questionnaire, which included demographics and medical history.

The baseline examination contained several criteria
for a subject’s referral for a follow-up examination to allow the highest sensitivity (see Referral Criteria for a Follow-up Examination). An ophthalmologist performed the follow-up examination for all subjects with abnormal findings and a subset of participants with normal findings to determine the accuracy of the baseline examination. The normal patients were selected using a random-number generator. The ophthalmologist was masked to the results from the baseline examination to reduce workup bias.

The follow-up examination included BCVA, Goldmann tonometry, biomicroscopy of the anterior segment, gonioscopy, Lens Opacity Classification System III grading of the lens,9 standard automated achromatic perimetry (24-2 Swedish Interactive Threshold Algorithm standard, Humphrey Field Analyzer II [Carl Zeiss Meditec Inc.]), a dilated fundus evaluation, and photography of the optic disc and macula.

The examiner used standard criteria to determine the prevalence of eye disorders (Table 1). An abnormal standard achromatic automated perimetry was defined as a pattern standard deviation outside 95% of age-specific norms, a glaucoma hemifield test result outside 99.5% of age-specific norms (outside normal limits on Statpac2 [Carl Zeiss Meditec Inc.]), or a mean deviation outside the 95% limits without a generalized reduction in sensitivity.

Data Analysis

We used statistical weighting to determine accurately the prevalence of glaucoma and OHT, because not all persons with a normal baseline examination were selected for the follow-up examination and not all persons with an abnormal baseline examination completed a follow-up examination.

FINDINGS

We recruited a total of 288 participants, whose baseline characteristics are listed in Table 2. Sixty-six percent completed the follow-up examination. We found no difference in participants’ age or gender when compared to those whom we were unable to contact (P > .05).

In general, American Indian/Alaska Natives had a lower average IOP, larger cup-to-disc ratio, and higher prevalence of glaucoma when compared with the results of previous studies in whites. On average, subjects’ IOP measured 12.9 ± 3.0 (range, 8 to 23) mm Hg with Goldmann tonometry. Thus, OHT was uncommon, occurring in only 0.004% (0 to 1.1 [the 95% confidence interval for the results using a Poisson distribution after statistical weighting]) of participants. Open-angle glaucoma occurred in 6.2% (2.6 to 7.8). All eyes with glaucoma (14 persons diagnosed with uni- or bilateral glaucoma) had NTG, defined as an IOP of less than 22 mm Hg. None was category 3, 47% were category 2, and 63% were category 1. The average central corneal thickness was 555 ± 36 µm. No cases were found of suspected or actual primary angle closure, primary angle-closure glaucoma, or pseudoexfoliation (PXF).

SIGNIFICANCE

One of the study’s intriguing findings was that all patients with glaucoma had an IOP of less than 22 mm Hg, otherwise known as NTG, on initial screening and one follow-up examination.10 Previous studies have shown than NTG may represent up to 69% of all patients with glaucoma.10 Our results (100%) are even higher, albeit with a small sample size and likely younger age distribution than other studies. Only a recent study containing Japanese participants had a similar proportion (92%) of NTG.11

We also found a low probability (0.004%) of OHT, which is present in approximately 5% of individuals over the age of 40 years.12 The Los Angeles Latino Eye Study found OHT in 3.6% of Latinos.13 Despite an association between central corneal thickness and a risk of develop-
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