Original research

The prevalence of ptosis in an Iranian adult population

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Abstract

Purpose: To determine upper eyelid ptosis prevalence and some related factors in 44- to 69-year-olds of Shahroud in the north of Iran.
Methods: In 2009, using multi-stage cluster sampling, 300 clusters of 40—64-year-olds were selected in Shahroud city, and all 5190 participants were invited to be re-examined in 5 years (2014). The current report is the second phase of the study in which 4737 (91.3%) people participated and underwent vision tests, slit lamp examination, biometry, and ophthalmoscopy in 2014. Upper eyelid ptosis was determined by an ophthalmologist.
Results: The prevalence of upper eyelid ptosis was 4.7% [95% confidence interval (CI): 4.1—5.4]; 5.2% in women and in 4.0% in men. The prevalence of bilateral and unilateral ptosis was 1.3% (95% CI: 1.0—1.7) and 3.4% (95% CI: 2.8—4.0), respectively. The observed prevalence of ptosis was 3.1% in the 45- to 49-year age group and 5.8% in 65- to 69-year-olds. The prevalence of ptosis increased with age. In the multiple logistic regression model, ptosis prevalence correlated with older age, diabetes (odds ratio = 1.53, 95% CI: 1.16—2.02) and hypertension (odds ratio = 1.41, 95% CI: 1.03—2.92). Mean corneal astigmatism was 1.02 (95%C]: 0.87—1.18) diopter in ptotic eyes and 0.87 (95% CI: 0.84—0.89) diopter in non-ptotic eyes ($p = 0.013$).
Conclusions: The present report provides valuable information on the prevalence of ptosis in a population of 45-to 69-year-olds. The prevalence of ptosis in this study was considerably high and significantly increased with age.

Introduction

Ptosis is one of the problems of the upper eyelid which is seen in adults and children.[1] Since the pupillary axis can be blocked by drooping eyelids, it becomes associated with non-development of the visual system in children and can lead to amblyopia by causing visual deprivation.[2,3] However, in adults, in addition to cosmetic issues, it can restrict the visual field and affect a person's daily activities and ultimately affect the patient's quality of life.[4,5] In children, most cases of ptosis

are congenital; in adults, however, ptosis develops as a result of an abnormality in the levator aponeurosis like a tear, strain, or disinsertion. The demographic characteristics of these individuals have been studied in several case series which described a dominant hereditary transmission mode for the congenital type and the role of family history as well as its management, treatment, and surgery.[1,6,7] However, few population-based studies have studied the prevalence of ptosis, and the geographical distribution and epidemiology of this eye problem is not well known.[1,8,9] A review of previous studies shows that the prevalence of ptosis in children is under 1% and has been reported up to over 10% in the elderly.[8,9] Due to the lack of population-based studies on the prevalence of upper eyelid ptosis, here we aim to describe ptosis prevalence in a population of 45- to 69-year-olds.

Methods

The present report is part of the second phase of the Shahroud Eye Cohort Study. The prevalence of upper eyelid ptosis in this report is based on data from the second phase of this study which was conducted cross-sectionally in 2014.

The methodology and sampling approach of this study have already been published, and here we review it briefly.[10] In the first phase during 2009, using a multi-stage cluster sampling, 300 clusters of 40- to 64-year-olds in Shahroud city were selected. In each cluster, at least twenty 40- to 64-year-old individuals were selected for participation in the study, and they were invited for a thorough ophthalmic examination. In the first phase, 6311 people were selected, and 5190 (82.2%) participated in the study. In 2014, the second phase of this study was done. All participants of the first phase were invited to have eye examinations in the second phase, and 4737 (91.3%) participated. After obtaining informed consent, all respondents were first interviewed and tested for non-cycloplegic refraction using autorefraction with the Nidek ARK-510A. Then uncorrected visual acuity at near and far was measured, and autorefraction results were refined by an optometrist using the Heine Beta 200 retinoscope. Using the information obtained up to this stage, subjective refraction was done for those with vision worse than 20/20. In the next stage, slit lamp examination was performed by an ophthalmologist who also determined the presence or absence of upper eyelid ptosis. Ptosis was considered present when the upper lid laid more than 2 mm below the superior corneal limbus. We also used corneal astigmatism data extracted from ocular biometric examinations.

Statistical analysis

We determined the prevalence of unilateral and bilateral ptosis as well as ptosis in at least one eye along with 95% confidence intervals (CI). In calculating 95% CI and standard errors, the cluster sampling method was considered. To investigate relationships, *t*-test and logistic regression were used, and odds ratios (OR) were calculated.

Table 1
The prevalence of ptosis by age and gender in the 45- to 69-year-old population of Shahroud, Iran, 2014.

	Overall % (95%CI)	Bilateral % (95%CI)	Unilateral % (95%CI)
Age groups			
45–49	3.1 (1.9–4.3)	0.7 (0.1–1.2)	2.4 (1.3–3.5)
50–54	3.7 (2.5–4.9)	0.8 (0.3–1.3)	2.9 (1.9–4.0)
55–59	4.7 (3.5–6.0)	1.7 (1.0–2.4)	3.1 (2.1–4.0)
60–64	7.1 (5.3–8.9)	2.3 (1.3–3.3)	4.8 (3.3–6.3)
65–69	5.8 (3.9–7.7)	1.3 (0.4–2.3)	4.5 (2.8–6.2)
Male	4.0 (3.0–5.0)	1.2 (0.7–1.7)	2.7 (1.9–3.6)
Female	5.2 (4.4–6.1)	1.4 (1.0–1.9)	3.8 (3.1–4.6)
Total	4.7 (4.1–5.4)	1.3 (1.0–1.7)	3.4 (2.8–4.0)

[1] CI = confidence interval.

Ethical issues

The Ethics Committee of Shahroud University of Medical Sciences approved the study protocol, which was conducted in accord with the tenets of the Helsinki Declaration. All participants signed a written informed consent.

Results

In the second phase of the Shahroud Eye Cohort Study, which was conducted five years after the first phase, 453 of the original participants did not participate due to death, migration, or unwillingness, and eventually 4737 were studied; 58.9% (2791 people) of them were female. For 36 people, ptosis data was missing, and eventually, this report was prepared using data from 4701 people. The mean age of the study participants was 55.9 ± 6.2 years (44- to 69-year-olds).

The prevalence of ptosis was 4.7% (95%CI: 4.1–5.4); 27.7% of cases were bilateral. The prevalence of bilateral ptosis was 1.3% (95% CI: 1–1.7), and unilateral ptosis was 3.4 (95% CI: 2.8–4). Table 1 describes the prevalence of upper eyelid ptosis in men and women by age groups. The prevalence of ptosis was 5.2% in women and 4.0% in men ($p = 0.064$; OR = 1.33, 95% CI: 0.98–1.80).

As demonstrated in Table 1, the prevalence of ptosis significantly increased from 3.1% in the 45- to 49-year age group up to 7.1% in the 60- to 64-year-old age group, and then it reached 5.8% in the 65- to 69-year-old age group. The Chi 2 for trend test showed significant changes in the prevalence of ptosis in different age groups ($p < 0.001$). The prevalence of ptosis in patients with a history of intraocular surgery in this study was not significantly different from those without a history of eye surgery ($p = 0.678$).

In a multiple logistic regression model, the relationship of the variables of age, education, gender, hypertension, dyslipidemia, and diabetes was studied. The results of this model are summarized in Table 2. The 60- to 64-year age group had a higher prevalence of ptosis compared to 45- to 49-year-olds. Also, diabetes and hypertension were directly associated with the prevalence of ptosis.

Mean corneal astigmatism was 1.2 diopter (95% CI: 0.87–1.18) in ptotic eyes and 0.87 diopter (95% CI: