

Prevalence of glaucoma in the Israeli Arab population

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Abstract

• We describe the prevalence and treatment of glaucoma in a Muslim Arab population in Israel. Based on the medical records of 15 122 persons, the overall prevalence of glaucoma was 3.9%. Prevalence rates of primary open angle glaucoma (POAG) and primary angle-closure glaucoma (PACG) were 3.0% and 0.42%, respectively. Prevalence rates of women were 135% that of men considering all types of glaucoma, 143% for POAG, and 96% for PACG. Prostaglandin analogs and beta blockers, alone or combined with carbonic anhydrase inhibitors, were the preferred medications. Of 68 patients who underwent trabeculectomy, 27 (39.7%) required medications, postoperatively, for treatment of glaucoma; following Ex-Press shunt surgery, 3/11 (27.3%) required medications. During the last three years, 16 (1.3%) individuals with POAG were recorded as legally blind as a result of glaucoma.

• **KEYWORDS:** glaucoma; Arab; trabeculectomy; beta-blockers

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INTRODUCTION

Glaucoma is a major disease that causes irreversible vision loss^[1]. The prevalence of glaucoma and its types have been found to vary greatly with ethnicity and geography^[2-3]. This suggests that genetic and environmental factors may play significant roles in the etiology of the disease. African Americans, Asians and Hispanics are populations that have been studied in particular^[2-3]. Primary open angle glaucoma (POAG) has been found to be highly prevalent among persons from African descent^[4-5]; and primary angle-closure glaucoma (PACG) among Asians, other than Japanese^[3]. The risk of glaucoma increases with age, and most

studies have found female gender to be a risk factor^[3]. In Arab populations, high prevalence rates and genetic associations have been found for juvenile-onset glaucoma^[6-7]; and genetic factors have been found to associate with adult-onset types of glaucoma^[8-9]. However, searching PubMed, we did not find any studies that assessed the prevalence of adult-onset glaucoma in Arab populations. We set out to assess the rates of diagnosed glaucoma and its types in a defined Arab population.

METHODS

The study population comprised residents of Tira, a Muslim Arab town in the Triangle region in Israel, who are insured by Clalit Health Services, the largest health maintenance organization in Israel. Clalit Health Services insures more than half the Israeli population, and 18 600 of the 22 600 (82%) residents of Tira. Individuals diagnosed with glaucoma were identified from patient files. Data accessed included the type of glaucoma, age at diagnosis, the types of medications prescribed to treat glaucoma, the number of individuals who underwent surgery as treatment for glaucoma, and the number of those legally blind as a result of glaucoma. Individuals were classified with POAG if they met any of the following diagnostic criteria: cup-to-disk ratio (CDR) >0.5 with asymmetry between the eyes and damage to the field of vision; intraocular pressure (IOP) >23 mm Hg; damage to the field of vision without CDR asymmetry, but with IOP >23 mm Hg; CDR asymmetry >0.5 with damage to the field of vision, independent of IOP; CDR asymmetry >0.2 and damage to the field of vision, with or without increased IOP; damage to the field of vision as defined by the following characteristics of glaucomatous field defects: asymmetry across the horizontal midline (in early/moderate cases), location in the mid-periphery (in early/moderate cases), clustering in neighboring test points, and reproducibility on at least two occasions. In addition, the condition should not be explainable by any other disease and should be considered a valid representation of an individual's functional status (based on performance indices such as false positive rate). The conduct of this study conformed to the principles outlined in the Declaration of Helsinki.

RESULTS AND DISCUSSION

Medical records were available for 15 122 (81%) of the residents in Tira who were insured by Clalit Health Services, comprising 67% of the total population of Tira. Overall prevalence was 3.9%, which compares with a reported

prevalence of 2.2% in the general Israel population^[10-11]. Of the total number of glaucoma cases, POAG comprised 77%, prevalences of POAG and PACG were 3.0% and 0.42%, respectively. Studies conducted in Japanese, black, Hispanic and white populations also reported considerably higher rates of POAG than PACG. This contrasts with studies of Asian populations, other than Japanese, which reported higher rates of PACG than POAG^[3]. Advances in diagnostic technology may explain, at least in part, the increasing gap in prevalence rates between POAG and PACG^[3]. On one hand, POAG is now diagnosed more easily; on the other hand, criteria for diagnosis of PACG have become more stringent.

We report increasing prevalence of all types of glaucoma with age. The prevalence of PACG peaked at age 60-69y. Of all the individuals with glaucoma in our population, 62% were women. Prevalence was greater for men than for women for all types of glaucoma, for the age groups 60-69y and 70-79y. For the age group 30-39y there was no difference between the genders in the prevalence of PACG. For all other age groups, prevalences were higher for women than for men. Prevalences for women were 135% that of men for all types of glaucoma, 143% for POAG, and 96% for PACG.

Our prevalence of PACG is similar to that reported in western Europe^[12]. We report POAG prevalence among individuals 40y and older of 8.4% (868/10 296), 10.1% (554/5476) among women and 7.3% (314/4320) among men. This compares with prevalences of 2.1%, 1.4%, and 4.2% reported for white, Asian and black populations in the UK, respectively^[13]. More recently conducted studies also reported lower prevalences for POAG in the ≥ 40 y population than did ours, 2.0% in Myanmar^[14] and 2.3% in Sri Lanka^[15]. In those studies, the mean ages were 56.2 and 57y, respectively, while in our study the mean age was 62y. This difference can explain our higher rate of glaucoma, since the risk of developing glaucoma is higher at an older age. Other studies showed higher prevalences, 3.5% in an Asian population^[16] and up to 8% in west Africa^[17].

We considered whether a reason for our high prevalence of POAG compared to other populations could be due to the absence of medical records for 3480 individuals insured by Clalit Health Services. However, even if we consider an extreme scenario, and assume that all these persons were above age 40y and none had glaucoma, the calculated prevalence rate for glaucoma would still be high, 6.3% (868/13 776). Neither do lenient diagnostic criteria explain the relatively high rates of glaucoma in our study. Rather, compared to other studies^[14-15], our diagnostic criteria were quite stringent. Another possible explanation for the high rate of glaucoma in our study is that once a year we conduct a screening day for glaucoma in which we enthusiastically promote patients to be examined. Since older persons are more available than younger ones, this may explain the higher prevalence in older patients. Lastly, the

continued, though decreasing prevalence of consanguineous marriages in the Israeli Arab Community^[18] could also contribute to the high rate of POAG in our study, since positive family history is a risk factor for POAG^[19].

For 548 of 909 individuals (60.3%) with POAG, records of prescriptions of medications were available. Of patients prescribed one medication, 72 (29.2%) were prescribed beta blocker eye drops, 86 (35.0%) eye drops that combined beta blockers and carbonic anhydride inhibitors, 82 (33.3%) prostaglandin eye drops, and 6 (2.4%) alpha blocker eye drops. The preference for prostaglandins, though without statistical significance, apparently results from the means of administration; once daily rather than twice, as with the combined medications.

Of 79 patients who underwent surgery to treat glaucoma, 68 underwent trabeculectomy and 11 Ex-Press (Alcon Inc., TX, USA) shunt surgeries. Following trabeculectomy, 27 (39.7%) required medications for treatment of glaucoma. Of them, 21 were prescribed one medication, 11 only beta blocker eye drops, 4 only prostaglandin eye drops, and 6 a combination of beta blockers and carbonic anhydride inhibitors. Following Ex-Press surgery, 3 (27.3%) were prescribed medication, all of them one type of eye drop: a combination of beta blockers and carbonic anhydride inhibitors.

During the last three years, 16 (1.3%) of our patients with POAG were recorded as legally blind (field of vision reduced to 10 degrees or visual acuity of less than 6/60) as a result of glaucoma. According to the Israel Registry of the Blind, glaucoma accounted for 11.8% to 14.3% of the new incidences of blindness in Israel between the years 1998 and 2003^[20]. In Israel, the prevalence of blindness from leading causes, such as age-related macular degeneration, glaucoma, diabetic retinopathy and maculopathy, optic atrophy and cataract was assessed as similar to that in other western populations^[20].

The data from the current study are based on the medical records of two-thirds of the residents of one Arab village. Due to the respective design, we were not able to diagnose the prevalence of undiagnosed glaucoma in our population. Another limitation of the study is that the information regarding medications is based on prescription data only, no data were available regarding the purchase of medications or compliance with taking them. In another study of this population, we found compliance with medication prescriptions for glaucoma to be only about 50%^[21]. In conclusion, the prevalence of glaucoma in an Arab town in Israel appears high compared to other populations of different ethnicities and geography. More studies are needed to discern the risk for glaucoma in Arab and Middle Eastern populations.

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