Glaucomatous blindness in the Negev: a descriptive study of age, sex, and ethnic patterns

ROBERT DAVID,¹ YAAKOV DAN,¹ AND DAVID H. STONE²

From the Departments of ¹Ophthalmology and ²Epidemiology, Faculty of Health Sciences, Ben-Gurion University of the Negev, Beer Sheva, Israel

SUMMARY Two sources of data (a blind register and the records of a glaucoma clinic) were used to study the age, sex, and ethnic characteristics of sufferers of glaucomatous blindness in the Negev region of Israel. Glaucoma was found to be the cause of blindness relatively infrequently (10% of eyes) among the registered blind population. The rate of blindness from glaucoma in the population was 0.38/1000. Glaucomatous blindness affected more males than females and more individuals of Eastern and Western origin. A steep gradient of increasing number of blind with advancing age was found in both sexes and both ethnic groups, but the gradient was steeper in males and females of Eastern origin. These findings are consistent with the pattern expected of a developing country and represent the first descriptive profile of the pattern of personal characteristics of sufferers from glaucomatous blindness in this region. The ethnic pattern resembles what is known about the natural history of glaucoma in pigmented and nonpigmented races.

Glaucoma is one of the main causes of blindness throughout the world. Its natural course is insidious, and, when it is detected and properly treated at an early stage, progression to blindness can usually be arrested.¹ Its relative importance as a cause of blindness varies from one country to another: it has been reported to be the second or third commonest cause of blindness in the United States^{2,3} and third in the United Kingdom,⁴ while in the developing countries it has been reported to rank only fifth.⁵

Little has been published about the causes of blindness in Israel generally or in its southern arid zone, the Negev, in particular. The present study was an attempt to assess the relative importance of glaucoma as a cause of blindness in the Negev and to establish the age, sex, and ethnic characteristics of sufferers from the condition.

Materials and methods

The definition of blindness accepted by the Israeli Ministry of Health, and by the authors of this study, is a visual acuity of 3/60 or less in the better eye or a reduction in the visual field to 20° or less.

Correspondence to Dr R. David, Department of Ophthalmology, Soroka Medical Center, Department of Ophthalmology, Beer Sheva, Israel.

Two independent sources of information were studied. The first was the Glaucoma Service of the Department of Ophthalmology, the Soroka Medical Centre, Beer Sheva, which serves virtually all glaucoma patients in the Negev area. For every patient there is a file containing demographic information as well as details of ophthalmological diagnosis and treatment. At the end of May 1982, when the data for this study were collected, there were 754 patients registered with the Glaucoma Clinic. Of these no blind patients were identified in the diagnostic categories of acute angle-closure glaucoma (119 patients), contusion angle-recess glaucoma (11 patients), and undefined glaucoma (24 patients). All of these cases, as well as 273 patients being followed up for ocular hypertension, were excluded. Of the remaining 329 patients 46 fulfilled the blindness criteria, and data on their age, sex, ethnic origins, and diagnosis were extracted from the records and analysed.

The second source of data was the Blind Register of the regional office of the Ministry of Works and Welfare. Of the 809 records of registered persons 139 did not contain sufficient information and hence were excluded from the study. Details of age, sex, and ethnic origin were extracted from the register, but in contrast with the clinic files the type of glaucoma was

Table 1 *Frequency of causes of registered blindness in the Negev in the 670 individuals (1340 eyes) for whom adequate records are available*

<i>Cause of blindness</i>	<i>No. of eyes</i>	<i>%</i>
1. Corneal disease	330	24.6
2. Retinal and afferent pathway disease	252	18.8
3. Retinal detachment and myopic degeneration	210	15.7
4. Phthisis and anophthalmus	196	14.6
5. Cataract	130	9.7
6. Glaucoma	127	9.5
7. Diabetic retinopathy	55	4.1
8. Optic atrophy	40	3.0
Total	1340	100.0

Table 2 *Distribution of type of glaucoma and frequency of blindness among the 329 glaucomatous patients under the care of the Glaucoma Clinic*

<i>Type of glaucoma</i>	<i>Total patients</i>		<i>Blind patients</i>	
	<i>No.</i>	<i>%</i>	<i>No.</i>	<i>%</i>
Open-angle	196	100	29	15
Chronic angle-closure	56	100	6	11
Low-tension	11	100	3	27
Secondary	50	100	4	8
Juvenile	16	100	4	25
Total	329	100	46	14

not recorded. Since the cause of blindness was not always identical in both eyes, each eye was analysed separately. Thus in this group there were 1340 eyes (for 670 persons).

Results

Table 1 shows the distribution of the causes of blindness among the 670 registered blind persons for whom sufficient data were available. Glaucoma was a relatively infrequent cause of blindness (10% of eyes). Fifty-nine individuals had bilateral glaucoma.

The distribution of the types of glaucoma and frequency of blindness among the 329 glaucomatous patients from the glaucoma clinic is shown in Table 2. Although open-angle glaucoma was the largest single contributor to the total number of blind patients, the proportion of all open-angle glaucoma patients who

were blind was only 15%, in contrast with the higher proportions blind among patients with the rarer types of glaucoma such as congenital and low-tension glaucoma, where the rates of blindness (25% and 28%, respectively) were higher.

Tables 3 and 4 show the distribution of blind persons according to sex and ethnic origin. In both sources males outnumbered females, and Jews of Oriental (Sefardi) origin outnumbered Jews of Western (Ashkenazi) origin. Interestingly, females outnumbered males among the 13 Western Jews attending the clinic and among the 8 Western Jews who were on the Blind Register, but the numbers are too small to draw meaningful conclusions from this.

Table 5 shows the steep age gradient in the distribution of blind persons identified by combining the 2 sources. Men appear to have become blind at a younger age than women and to have preceded women by roughly one decade.

Only 10 of the 46 blind patients identified from the glaucoma clinic appeared on the Blind Register. Adding the remaining 36 to the 59 individuals with bilateral disease identified from the Register gave a total figure of 95 persons with glaucomatous blindness. Since the total population of the Negev was estimated to be 276 000 in 1980,⁶ this represents a prevalence of glaucomatous blindness of 0.38 per 1000.

Discussion

For the first time this study has provided baseline descriptive data on the age, sex, and ethnic characteristics of victims of glaucomatous blindness in the Negev. The relatively low ranking of glaucoma in the frequency table of causes of blindness in this study is similar to the findings reported from developing countries,⁵ although comparisons are problematical because of varying definitions of blindness. The Negev population structure may account for this pattern, in that it contains a high proportion of children and younger people, as well as a larger Jewish immigrant population originating from North Africa, who present severe trachomatous sequelae contracted in their countries of origin. The ethnic composition of the patients under the care of the Glaucoma Clinic is equally divided between patients

Table 3 *Ethnic origin and sex distribution of patients with glaucomatous blindness identified from the Glaucoma Clinic*

<i>Ethnic origin</i>	<i>Males</i>		<i>Females</i>		<i>Sex (M:F) ratio</i>	<i>Total</i>	
	<i>No.</i>	<i>%</i>	<i>No.</i>	<i>%</i>		<i>No.</i>	<i>%</i>
Eastern	22	78.6	11	61.1	2.0	33	71.7
Western	6	21.4	7	38.9	0.9	13	28.3
Total	28	100	18	100	1.6	46	100

Table 4 Ethnic origin and sex distribution of patients with glaucomatous blindness identified from the Blind Register

Ethnic origin	Males		Females		Sex (M:F) ratio	Total	
	No.	%	No.	%		No.	%
Eastern	40	95.2	11	64.7	3.6	51	86.4
Western	2	4.8	6	35.3	0.3	8	13.6
Total	42	100	17	100	2.5	59	100

Table 5 Age and sex specific prevalence rates of ascertained glaucomatous blindness in the Negev

Age (years)	Males		Females		Total	
	No.	Rate/1000 pop.	No.	Rate/1000 pop.	No.	Rate/1000 pop.
0-40	4	0.04	1	0.01	5	0.03
41-50	3	0.27	2	0.17	5	0.22
51-60	13	1.55	5	0.56	18	1.04
61-70	14	2.68	8	1.42	22	2.03
70+	30	7.94	15	3.61	45	5.67
All ages	64	0.53	31	0.25	95	0.38

Chi-square: (males)=156 (4df); $p<0.001$. Chi-square: (females)=84 (4df); $p<0.001$. Yates's continuity correction applied in both cases.

of Eastern and Western origin, while the frequency of blindness is much higher among those of Eastern origin. The lack of available data on the distribution of the population of the Negev by ethnic groups makes it difficult to draw firm conclusions, but this finding suggests that the natural history of glaucoma takes a more severe course among patients of Eastern origin. Some support for this hypothesis comes from reports in the literature that glaucoma has a poorer visual prognosis in pigmented races.⁷⁻⁹

The age and sex characteristics which we observed are consistent with data from elsewhere. The steep increase in glaucomatous blindness after the age of 50 is well recognised, as is the more rapid progression to blindness among males than in females.^{3,4} Our finding that the sex ratio among the Western blind (the majority of whom were female) is the reverse of that of the Eastern blind (the majority of whom were male) is difficult to interpret because of the small numbers.

The fact that 36 blind patients in the Glaucoma Clinic were not on the Blind Register is not surprising in view of the findings of other authors that up to 50% of blind people may not be registered.^{10,11} The observation that 90% of the registered blind in the present study were of Eastern origin probably reflects behavioural rather than biological differences.

Finally, it is noteworthy that 30 of the 46 blind patients under the care of the glaucoma clinic had undergone, at some stage, pressure-lowering surgery in an attempt to arrest the downhill course of the disease. This inability to control some glaucoma cases

has been acknowledged previously¹² and should always be borne in mind by the practising ophthalmologist.

This study was partly supported by the Middle East Eye Research Institute, Ben-Gurion University of the Negev, Beer Sheva, Israel.

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